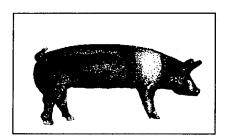
COMPREHENSIVE NUTRIENT MANAGEMENT PLAN



STEVE CANNON

In

CARLISLE County, Kentucky



Assisted by
United States Department of Agriculture
Natural Resources Conservation Service

Nutrient Management Plan, Pages 1-9

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Preface

This Nutrient Management Plan has been developed to accompany a request to construct and operate a new Swine Feeding Facility owned and operated by Steve Cannon in Carlisle County Kentucky. This nutrient management plan has been developed based on information provided by Tosh Farms Company Representatives, with technical assistance provided by the University of Kentucky Cooperative Extension Service, and the Natural Resources Conservation Service. This plan has been developed in accordance with the Kentucky NRCS Nutrient Management Field Office Technical guide standard 590 that is currently in effect as of November 24th, 2008.

System Description

This swine feeding facility will consist of Two (2) Tosh Farms, nursery to finish hog barns. All feeding and manure collection will be under roof, on concrete slated floors directly over a deep concrete pit. Hogs will be watered using new technology drinking system to minimize the addition of water into the pit. Soil samples have been analyzed by Spectrum Analytic Inc, using the Mehlich-3 method and a NRCS Phosphorus index rating has been completed for each field to also verify the planned implementation of a Nitrogen Based Nutrient Management Plan. Liquid manure will be injected each spring from April through Mid May at a rate not to exceed the Plant Available Nitrogen (PAN) needs of Corn. University of Kentucky Nutrient recommendations, AGR-1 will be used to determine annual PAN need for Corn. See Appendix B-Page 1, "Tosh Farms two (2) Barn System Flow Chart."

Manure Collection and Storage

Manure generated by this operation will be stored in a deep concrete pit, which is located beneath a slated floor. Based on company design and floor plans, the pit will have an inside storage dimension of 195.5 feet long by 99.5 feet wide with a effective storage depth of 7.33 feet. After making reductions for concrete supports and pillars each pit will have a maximum storage capacity of approximately 141,911.39 cubic feet. See Appendix A, Tosh Farms Standard Hog Barn Pit Dimension and Foundation Plans.

Estimated Amount of Liquid Manure Generated

Based on information obtained from Tosh Farms Company representatives, each barn will be populated with approximately 2,480 head. Animals will arrive at approximately 15.0 lbs and be harvested at approximately 260 lbs. The average weight (130.0 lbs) was derived by swine growth curves in consultation with U.K. Extension Ag Engineer and Swine specialist. The annual confinement period was reduced from 365 days to 345 days to account for time periods necessary to conduct cleanout, disinfection and maintenance. NRCS has estimated the total amount (two barns) of Liquid waste Generated per confinement period to be approximately 278,640.4 Cubic Feet. Based on 1 cubic foot containing 7.5 gallons, this equates to approximately 2,089,803.0 gallons of liquid waste. See Appendix B, page 2 - Estimating Animal Waste Generated per Confinement period.

Manure per A.U. factor of 1.15 cu.ft./A.U. & Gallons per head day of 0.1 gallons differs from Table I of KYFOTG 590. These revised factors where determined to be more representative during NRCS, U.K. and Tosh Farms meeting held 12/20/2005.

Nutrient Analysis

A manure sample was pulled in November of 2005 from an existing, Tosh Farm Hog Barn currently in operation on a nearby farm owned by Charlie Cannon. Management will be the same for this new application, so this nutrient analysis has been used rather than NRCS book value listed in KY FOTG 590 to more accurately estimate the total amount of nutrients generated per confinement period. See appendix B, sheet 3 -- U.K. Manure Sample Report dated 11-17-2005.

Estimated Amount of Total Available Nutrients Generated

Using the availability coefficient found in KY NRCS FOTG standard 590, appendix A, Table 5, NRCS has estimated that the total liquid amount of 2,089, 803.0 gallons will contain a total of 51,409.15 lbs of total plant available nitrogen (PAN). During the same confinement period also a total of 53,498.95 lbs of available phosphorus and 58,514.48 lbs of potassium will be produced. See Appendix B -- Page 4 "Estimating Nutrients Generated Per Confinement Period."

Determining Nutrient Based Plan

Option 1 -- Soil Test Phosphorus Threshold (PT) Levels

Soil samples have been collected from all fields and analyzed by spectrum Analytic Inc., using the approved Mehlich-3 method. Based on soil test reports it was determined that none of the fields have a residual Soil Test Phosphorus (STP) level that is equal to or greater than 400 lbs per acre. Based on KY NRCS FOTG Standard 590, when the STP levels are less than 400 lbs per acre as the operator I have the option of implementing a nutrient management plan based on nitrogen utilization. See Appendix B, page 5 - Determining Nutrient Based Plan Flow Chart.

Option 2 -- Phosphorus Index (PI) rating

In addition to soil sampling, the NRCS office in Carlisle County has also completed a Phosphorus Index rating for all fields. It has been determined by NRCS that based on following the recommendations of the Conservation plan, all of the fields will have a "medium" potential for phosphorus movement. Based on KY NRCS FOTG Standard 590, a phosphorus index rating of low to medium also permits the application of animal waste plan based on nitrogen. See Appendix B, page 5 – Determining Nutrient Based Plan Flow Chart.

Crop and Cropland Needs to Apply Nitrogen Based Plan

Based on University of Kentucky Cooperative Extension Service Publication AGR-1, Lime and Nutrient Recommendations, in Kentucky, corn planted using conservation tillage on Moderately well to somewhat poorly drained soils should receive 165 to 200 lbs of Nitrogen. If applied to meet these AGR-1 rates, it will require from 311.6 acres (165 lbs/ac) to 257 (200 lbs/ac) acres of corn each year to fully utilize the Plant Available Nitrogen.

To fit my existing crop rotation, I plan to apply the 51,409.15 lbs of PAN on the 386.5 acres of corn that annually is being grown in rotation with winter wheat and double crop soybeans. This will result in approximately 133 lbs/acres of PAN being applied from Swine Waste. Since my commercial Nitrogen fertilizer is typically applied at the higher 200 lbs/ac rate, I will also side dress anhydrous ammonia at an additional rate of 65 lbs N per acre.

Utilization of Phosphorus Carryover by Crop Rotation

Based on the example swine waste analysis, as a result of applying the 2,089,803.0 gallons on 386.5 acres (5,407 gallons/ac) this application rate will also result in the application of approximately 138.4 lbs/ac of Phosphate (P205) and 151.4 lbs/ac of Potassium (K2O).

The uptake or utilization of total phosphorus and potassium will be based on the estimated plant needs of the Corn + Wheat + Soybeans (page 6cwb). The calculation for uptake of P & K is based on KY NRCS FOTG Standard 590, appendix A, table 6, "crop nutrient removal values". The yields used in the calculation of this value is based on the National Agriculture Statistics Service (N.A.S.S.) 10 year average Corn, Wheat and Soybean yields for Carlisle County Kentucky. Enclosed you will find a N.A.S.S. spreadsheet showing that the 1998-2007 average yields for; Corn = 138.6 bu/ac, Wheat = 50.3 bu/ac, and Soybeans = 37.5 bu/ac.

NRCS 590 estimates that after the Corn, wheat and soybean rotation has been fully completed, approximately 31.56 lbs/acre of phosphorus and 46.55 lbs/ac of potassium is projected as "carryover". After each cycle of Corn, Wheat and double Crop soybeans, soil tests will be pulled to determine actual soil test phosphorus (STP) levels. When the STP amount reaches 400 lbs/ ac, NRCS will be contacted to re-evaluate Phosphorus Index rating for each field. See Appendix B, page 6cb and page 6cwb – Estimating Cropland Needed to Utilize Nutrients.

Additional application of Commercial fertilizer

No additional applications of phosphorus and potassium will be applied to any crop fields planned for application of animal waste. However, an additional application of Nitrogen is planned to meet the maximum AGR-1 nitrogen recommendations for both Corn and wheat. As mentioned before, plans are to side dress Corn with an additional 65.0 lbs/ac using anhydrous ammonia. Furthermore, at this time plans are to apply Urea in a single spring application on wheat at the U.K. recommended rate of 95 lbs/ac.

Land Application Location, Acreage, Methods, Timing, Form, and Rates

Manure will be applied using a liquid vacuum implement typically used to inject swine manure. Manure will be injected in the spring when ground conditions permit and not greater than 30 days prior to the planting of corn. See Appendix B, page 7 thru 13 - Planned Application Summary record to obtain farm ID information, field numbers, cropland acres, planned crop, application timing, form of waste, application method, planned nitrogen application rates, manure application rates in gallons per acre, Soil Test Phosphorus levels and NRCS Phosphorus Index (PI) ratings.

Major Land Application Operation and Maintenance Requirements

- Liquid manure shall not be applied on saturated, frozen and/or snow-covered soil.
- Liquid manure shall not be applied more than 30 days prior to planting of corn.
- Liquid manure shall not be applied in any defined drainage way that carries concentrated water flow.
- Liquid manure shall not be applied 48 hours prior to a forecast of rain (50% chance) or within 48 hours of receiving at least a ½ inch rain.
- Equipment shall be calibrated to ensure liquid manure is applied at recommended rates.
- Liquid manure shall be injected into the soil, no surface application.
- Soil erosion shall be controlled according to NRCS developed Conservation Plan.

Minimum Land Application Setbacks

Liquid manure shall not be applied within the following minimum land application setbacks;

- 1000 feet of an incorporated city limits,
- 500 feet of any dwelling other than applicant
- 150 feet of a well not owned by applicant,
- 75 feet from a river, lake or solid blue line stream on a USGS 7.5 minute quad map

Best Management Practices – Conservation Practices

The following conservation practices or Best Management Practices (BMP's) will be applied to minimize the movement of nutrients, pathogens, organic materials, and soil to surface waters.

- Conservation Crop Rotation: (328) (Corn, wheat, Beans)
- Residue and Tillage Management, No-till: (329) (Wheat & Double Crop Beans)
- Residue and Tillage Management, Mulch Till: (345) (Corn after spring injection)
- Grassed Waterways: (412)
- Grade Control Structures: (410)
- Filter Strips: (393)
- Nutrient Management: (590)

Refer to enclosed NRCS Conservation Plan attached in Appendix C of this Nutrient Management Plan.

Soil Testing Procedures

Soil nutrient levels shall be monitored by soil testing to determine the buildup of phosphorus and potassium in the soil. Soil test analysis must include at minimum pH, phosphorus, and potassium. Agriculture lime shall be applied to maintain or adjust the pH to a range between 6.5 to 7.2. Routine soil testing by field shall occur according to University of Kentucky guidelines when nutrients in any form are land applied during the crop year.

Soil samples are to be collected in accordance with The University of Kentucky extension service guidance.

Soil testing is to be performed by laboratories that meet <u>all</u> of the following:

- Certification In The North American Proficiency Testing Program (Soil Science Society of America)
- Other laboratories whose test results are accepted by The University of Kentucky
- Soil Test Phosphorus (STP) is determined by the Mehlich III method

Soil profile sampling for nitrogen, Pre-Side dress Nitrogen Test (PSNT), Pre-Plant Soil Nitrate (PPSN) or soil surface sampling for phosphorus or acidity may be necessary in situations where there are special production or environmental concerns.

See in attached Appendix D, University of Kentucky's cooperative Extension service publication, AGR-16, titled, "Taking Soil Test Samples".

Manure Testing Procedures

Testing of the manure shall include an analysis for Total Nitrogen, Phosphorus and Potassium. Since the swine waste will be in liquid form and applied using a flow meter, the results should be obtained in pounds of nutrients per 1000 gallons. Annual testing of manure is not required unless management changes occur that could alter the analysis data collected in a prior year. Procedures for collecting manure samples are provided in Appendix D of this plan.

Manure Sold and No Longer Under Control

Due to record high nutrient prices, manure generated by this system may be sold for soil amendment properties. If this situation arises, as the operator, I understand that I am responsible for documenting quantities of manure transported off-site; including the name of the recipient, date and amount transported. This documentation will be maintained in the Appendix E -"Record Keeping" Section of this nutrient management plan.

Manure Transported Off-Site (Roads & Highways)

Manure will need to be transported off-site by using a Honey Wagon or Tanker truck. In case of an accidental spill, every effort shall be made to contain the manure on site and immediately report the incident to the Kentucky Department of Transportation, and the Kentucky Division of Water. All truck operators and vehicles will meet applicable KYDOT requirements to use State Highway and/or local county roads.

Feed Management

All swine feed rations are developed by Tosh Farms and delivered by the vertical integrator on a schedule that matches animal growth and development. Information provided by company representatives indicates that a feed additive "Phytase" is added to reduce the phosphate dietary requirements of the hogs and reduce the phosphate in the manure. Manure analysis will be used to monitor the actual phosphors content of the manure.

Dead Animal Management

Dead animals will be disposed of according to state or local laws and in a way that does not adversely affect ground or surface water or create public health concerns. Though animal mortality is a certainty, no deduction has been made in estimating the volume generated by the system. Dead animals will be "rendered" by Griffin Industries of Union City Tennessee.

Record Keeping

Tract, Crop unit and/or Field-by-field records shall be kept by the producer for a minimum of 5 years for fields where the producer has control to apply manures. Recordkeeping will include information pertaining to specific field manure applications. This information is to be maintained in Appendix E— "Record Keeping" section of this Nutrient Management Plan.

Additional records for the operation shall include:

- 1. Soil test results Lab using Melich III method to document the soil phosphorus level (STP).
- 2. Manure Analysis Report Lab result of amount of N, P, K expressed in lbs/1000 gallons
- 3. Location manure was applied. (e.g. Farm name or tract no. field name/no.)
- 4. Date and method manure was applied.
- 5. Amount and form of manure applied
- 6. Crop type and acres planted
- 7. NRCS Phosphorus Index rating for tract/field(s).
- 8. Necessary documentation to account for sale of manure and no longer under control.
- 9. Documentation of any revisions, adjustments etc...

PLAN AGREEEMENT

Name of Operator: STEVE CANNON

The Kentucky Department For Environmental Protection Division of Water (DOW) acting under the authority of the Clean Water Act of 1972 requires that animal byproducts (manure, feedlot or holding area runoff, milk house supernatant, silo drainage, etc.) be managed so as not to enter the waters of the State. This Nutrient Management Plan provides the basic information on how the manure produced from your operation, and/or applied on your fields, will be utilized. Is this plan considered to be part of a Comprehensive Nutrient Management Plan (circle Yes or No). If YES, other components could apply that may not be referenced in this document. For further information reference Appendix C.

Operator Agreement

I (we) understand and will follow and implement this plan for the farm named above. I (we) know that any expansion or management change to the existing design capacity of the system will require a revised plan and possibly a new or revised permit. The approved plan should be filed on-site at the farm. When implementation of this plan is a required component of a regulatory permit or is mandated by other regulations, I will assume all responsibility for compliance. Manure that is sold or given away must be documented by the operator. The recipient is responsible for handling and utilizing the animal waste in accordance with state laws and regulations.

Signatures:

Operator Information (Persons Responsible For Plan Implementation):

Print Name: <u>STEVE CANNON</u>

Signature: Seed and

Nutrient Management Plan Developer Information:

Print Name: Todd C. Templeton, NRCS Resource Conservationist

59 Construction Road, Mayfield KY 42066 Phone: (270) 247-9529, ext- 3

Certified Nutrient Management Planner: 2/16020/6 1ct



CNMP APPENDIX A

TOSH FARMS STANDARD HOG BARN

DEEP PIT

&

FOUNDATION

PLANS

TYPICAL TOSH HOG BARN PIT

Volume (cubic feet) = Length X Width X Depth

- Length (inside) = 195.5 feet
- Width (inside) = 99.5 feet
- Effective Depth = 7.33 feet

195.5' X 99.5' X 7.33' = 142,584.99 cubit feet

Reduce Storage area occupied by;

Support Columns 117 ea. $X (IIr2 \times 7.33') = 673.6$ cubic feet

Total Available Storage= 141,911.39 cubic feet

141,911.39 cubic feet x 7.5 gallons per cu.ft. = 1,064,335.4 gallons

1,064,335.4 X 2 pits = 2,128,670.8 gallons (total storage)

TOSH FARMS STANDARD HOG BARN

GENERAL NOTES

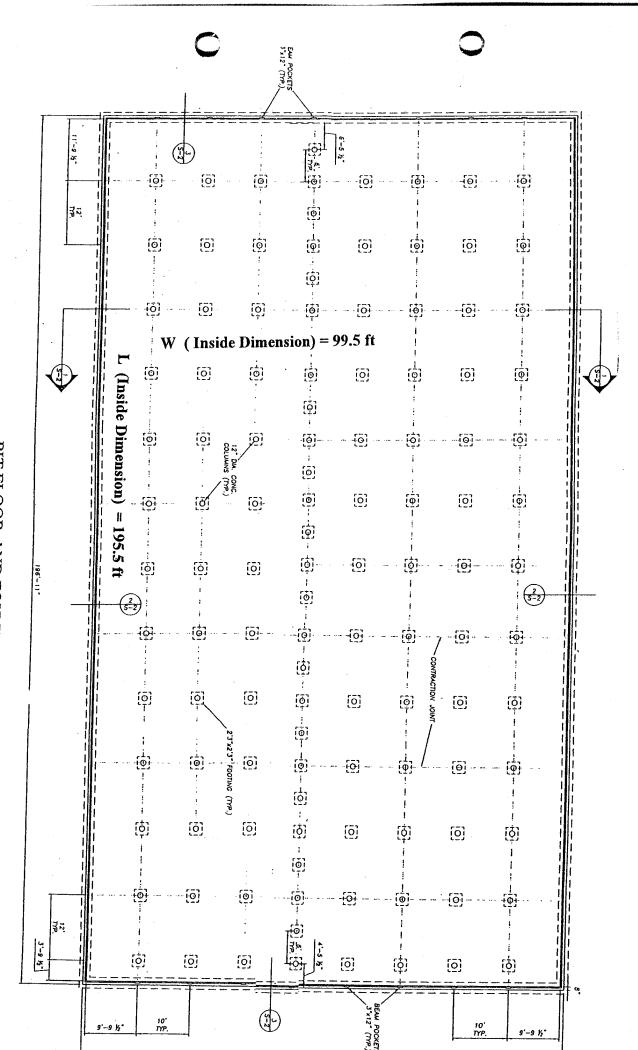
- 1. THESE PLANS ARE EXCLUSIVELY FOR THE USE OF TOSH FARMS. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY USE OF THESE PLANS BY ANY OTHER PERSON OR ENTITY.
- 2. IT IS RECOMMENDED THAT A PERIMETER TRENCH DRAIN BE INSTALLED, AND MADE TO DRAIN TO A FREE OUTLET WHENEVER POSSIBLE TO RELIEVE LATERAL PRESSURES AGAINST THE PIT WALLS.
- 3. WHENEVER EXPANSIVE SOILS ARE PRESENT, THIS DESIGN SHOULD NOT BE CONSIDERED VALID UNLESS AT LEAST 2 FEET OF EXCESS SOIL IS EXCAVATED BELOW THE SLAB AND REPLACED WITH SUITABLE COARSE GRAINED MATERIAL.
- 4. UPLIFT OF THE STRUCTURE MAY OCCUR IF THE WATER TABLE IS WITHIN 6 FEET OF THE NATURAL GROUND SURFACE (2' ABOVE PIT FLOOR). IF HIGH WATER TABLE IS ENCOUNTERED OR SUSPECTED, ANOTHER SITE SHOULD BE SELECTED.
- 5. THESE PLANS DO NOT CERTIFY TO THE DESIGN OF THE PRECAST BEAMS, SLATS, OR BUILDING SUPERSTRUCTURE.

SHEET: DETAILS S = 2 L. I. SMITH & ASSOCIATES, INC. SURVEYORS • ENGINEERS 302 Nor Paris, Tennessee 38242 731-644-1014 800-247-6847 FAX 731-644-0109 1100 Lebanon Pike, Suite 105 Nashville; Tennessee 37210

FAX 615-256-0290

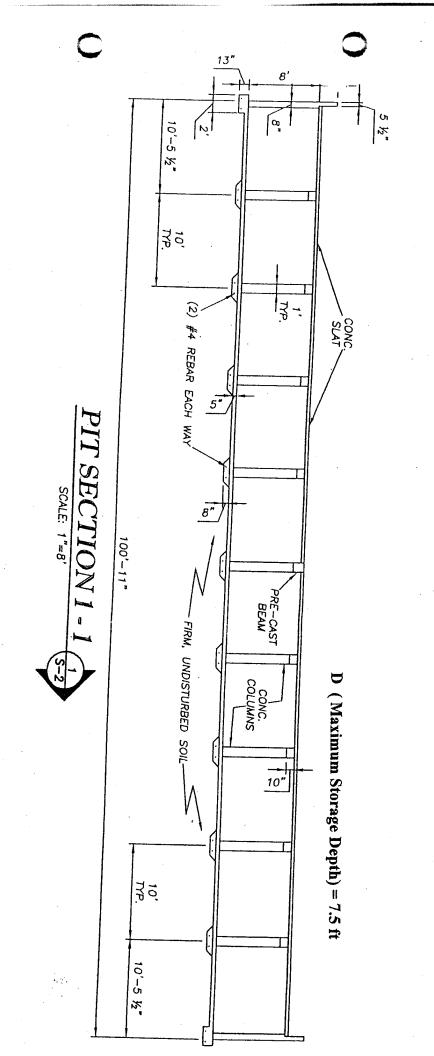
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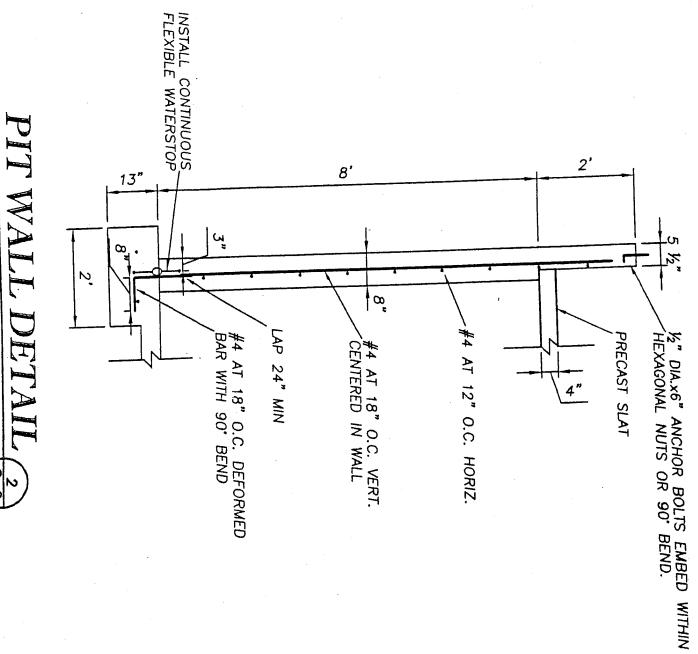
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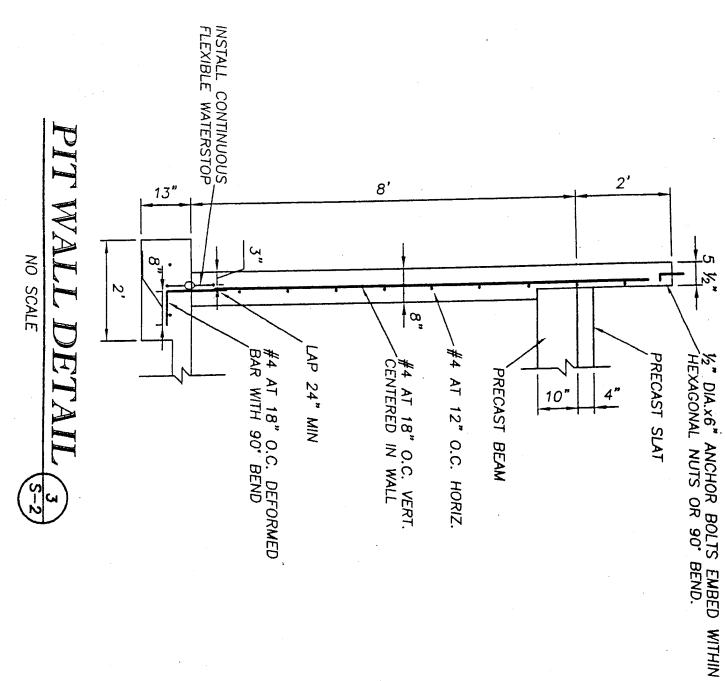
PIT FLOOR AND FOUNDATION PLAN TOSH FARMS

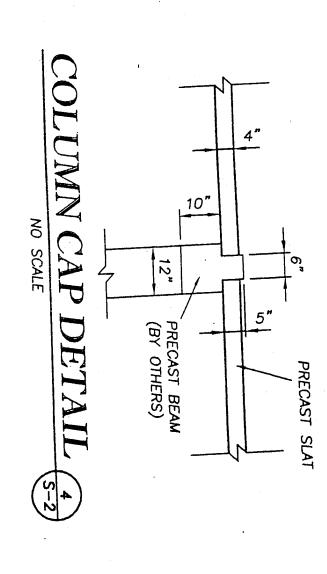
FLOOR PLAN S-1



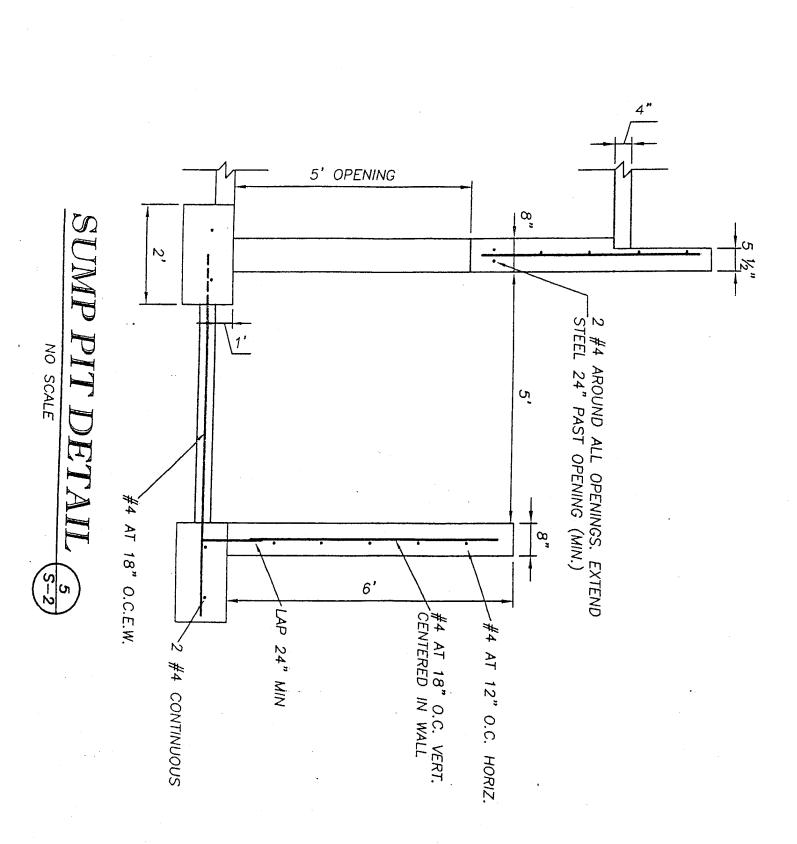


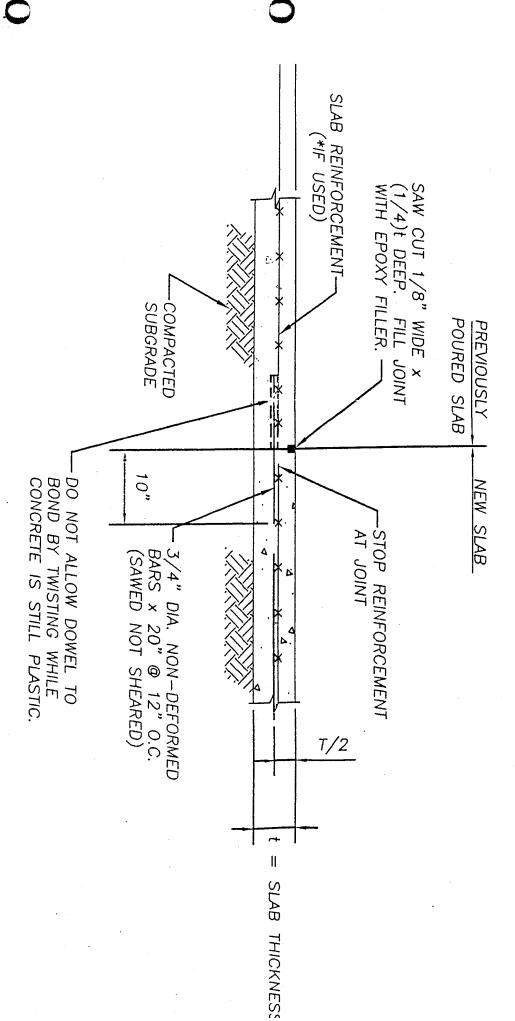
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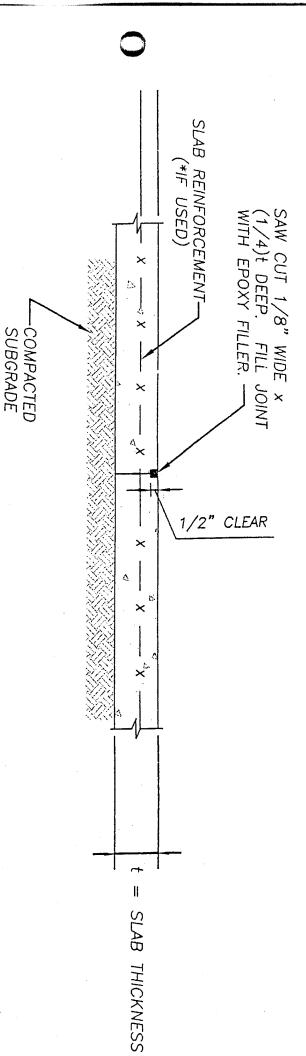
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SLAB CONSTRUCTION JOINT DETAIL

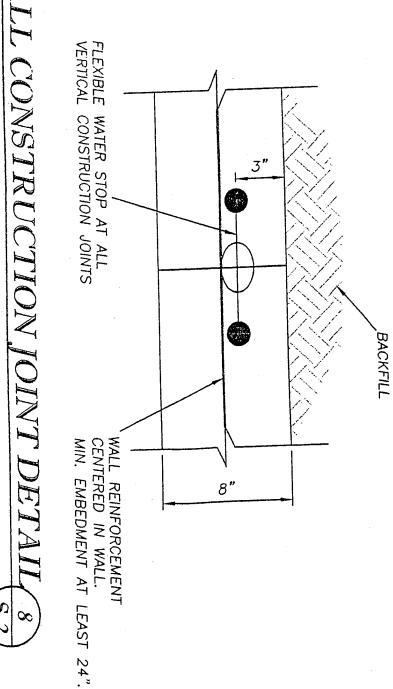
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SLAB CONTRACTION JOINT DETA

N.T.S.



WALL CONSTRUCTION JOINT DETAIL

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COMPREHENSIVE NUTRIENT MANAGEMENT PLAN (CNMP) FOR

STEVE CANNON

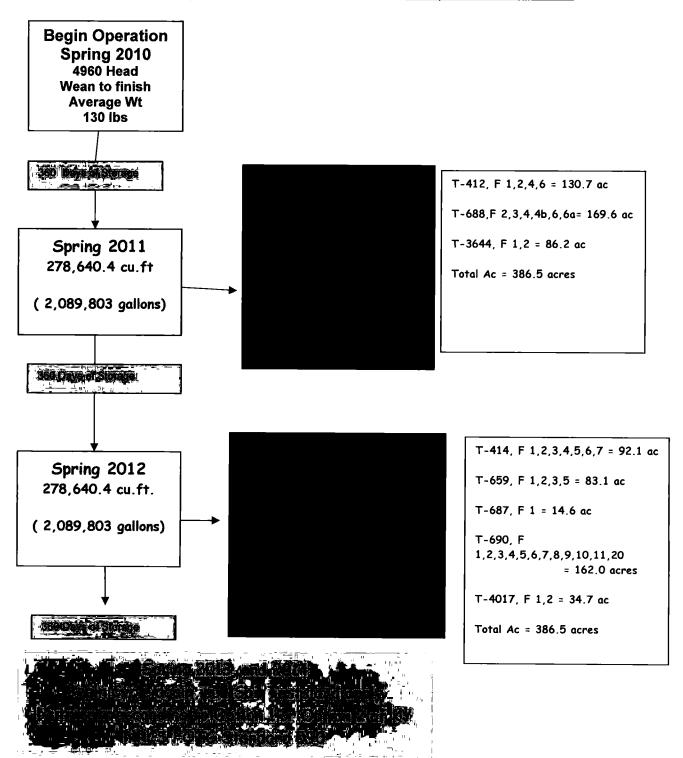
APPENDIX B

- Page 1 Tosh Farms two (2) Barn System Flow Chart
- Page 2 Estimating Animal manure generated per confinement period.
- Page 3 University of Kentucky Manure Test Report
- Page 4 Estimating Nutrients generated per confinement period.
- Page 5 Determining Nutrient Based Plan Flow Chart
- Page 6cwb Estimating Cropland needed to utilize nutrients
- Page 7– Summary record of planned Nutrient application For Corn in spring 2011
- Page 8– Summary record of planned commercial fertilizer Application to wheat in early spring 2012
- Page 9

 Summary record of planned Nutrient application
 For Corn in spring 2012
- Page 10– Summary record of planned commercial fertilizer Application to wheat in early spring 2013
- Page 11– Summary record of planned Nutrient application
 For Corn in spring 2013
- Page 12- Summary record of planned commercial fertilizer Application to wheat in early spring 2014
- Page 13– Summary record of planned Nutrient application For Corn in spring 2014

Steve Cannon

Appendix B - Page 1 " Tosh Farms Two (2) barn system Flow Chart"



WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD Barn

LIQUIDS WORKSHEET

1. Nutrients Generated (As Excreted)

Animal Nimber y Percent

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38929.8				38929.8				K ₂ 0

5. Water Added from Rainfall m	Water Added by Feedlot Runoff (cu.ft.) (From animal waste software)	0.1 x 2480 x 345 (Gal/hd/day) x (No. of Head) x (days of confinement per year) / (7.5)	3. Water Added by Flushing Wastage of Classing (s. 4.)			
5. Water Added from Rainfall minus Evap. on Storage Structure (cu.ft.) (From animal waste software)	ff(cu.ft.)(From animal waste software)	$\frac{345}{\text{s of confinement per year)}} / (7.5) = 11408$				
m animal waste software)		127,912.20		0	111,228	Animal Unit X Days (from Step 1)
		+ 114008 =	Step 2 Total	× ×	× 1.15 =	*
		11,408 cu.ft. Total	127,912		127,912.20	Volume of Manure
cu.ft.	cu.ft.	cu.ft. Total	cu.ft	່ ເພ.ກະ	cu.ft.	

cu.ft.

6. Total Tons = Step 2 + Step 3 + Step 4 + Step 5/

Tons

32 Cu. Ft./Ton 139,320.2 ft³ x 755 gal/ft³ =

4,353.75 Ton: 1,044,901.5 gallons §

WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

LIQUIDS WORKSHEET

1. Nutrients Generated (As Excreted)

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			/ 1000 × 345		Confinement Period (days/yr)
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57838.56 45603.48			1000.40	45603 48	P ₂ 0 ₅ (lbs)
38929.8			38929.8		K ₂ 0

		· · · · · · · · · · · · · · · · · · ·
3. Water Added by Flushing, Wastage, or Cleaning (cu.ft.)		An Day
	Step 2 Total	Animal Unit
11,408	127,912	Volume of Manure = 127,912.20 =

 $\frac{0.1}{\text{(Gal/hd/day)}} \times \frac{2480}{\text{(No. of Head)}} \times \frac{\text{(days of confinement per year)}}{\text{(7.5)}} = \frac{(7.5)}{\text{(7.5)}}$

11408

127,912.20

+

Water Added by Feedlot Runoff (cu.ft.) (From animal waste software) 5. Water Added from Rainfall minus Evap. on Storage Structure (cu.ft.) (From animal waste software)

6. Total Tons = Step 2 + Step 3 + Step 4 + Step 5/ 32 Cu. Ft./Ton 139,320.2 ft³ x 755 gal/ft³ Ħ 1,044,901.5 gallons § 4,353.75

	14408		Total		1.15
	11			п	11 11
	139,320.2 cu.ft. Total	11,408	127,912		127,912.20
cu.ft.	Total	cu.ft.	cu.ft.	cu.ft.	cu.ft.

cu.ft.

Tons

WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

LIQUIDS WORKSHEET

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115677.12				115677.12	2
115677.12 91206.96 77859.6			91206.96	+	P ₂ 0 ₈ (lbs)
77859.6			77859.6	_ 	K ₂ 0

		An Days
S) o	imal Unit x s (from Step 1) 222,456 x
Step 2 Total	11 1	val Unit X Manure/A.U. = from Step 1) Table 1 value 2,456 X 1.15 = 0 X - -
255,824		Volume of Manure 255,824.40

3. Water Added by Flushing, Wastage, or Cleaning (cu.ft.)

0.1 × 4960 × 345 (Gal/hd/day) x (No. of Head) x (days of confinement per year) / (7.5)

Nater Added by Feedlot Runoff (cu.ft.) (From animal waste software)

5. Water Added from Rainfall minus Evap. on Storage Structure (cu.ft.) (From animal waste software)

22816

255,824.40 + 22,816

11

278,640.4 cu. ft. Total

22,816 cu.ft. cu.ft. cu.ft.

cu.ft.

8,707.51 cu.ft.

Tons

2,089,803.0 Gallons

6. Total Tons = Step 2 + Step 3 + Step 4 + Step 5/ 32 _Cu. Ft./Ton

 $278,640.4 \text{ ft}^3 \times 7.5 \text{ gal}/\text{ft}^3$

Appendix B - Page No.2 -- Estimating Animal manure Generated Per Confinement Period

Part A. Calculation of Animal Unit Days							
(A) Animal Type	(B) Number	(C) Waste as Liquid	(D) Average Weight	(E) Lbs per Animal Unit	(F) Confinement Period (days/yr)	(G) Animal Unit Days	
Swine Wean to Finish	4960	100%	130.0	1000	345	222,456	

- A. Weaning Pigs arrive at approximately 15.0 lbs and depart at approximately 260.0 lbs
- B. Two Tosh Farm Barns with planned population of 2,480 head.
- C. All Swine Manure and water generated during cleanout will be collected in pits beneath slated floors
- D. Average Weight See growth Curve documentation generated by Doug Overhults, U.K. Ag Engineer Specialist
- E. Animal Unit = 1000.0 lbs live weight
- F. 345 Days was derived from 335 Days (@ 100% Capacity) + 10 Days (20 days @ 50% capacity) + 10 days Empty
- G. $(B \times D) / E \times F = Animal Unit Days$

Part B. Manure Generated (As Excreted)							
Animal Unit Days	(H) Manure per A.U. KYFOTG 590 Table 1	(I) Volume Manure Cu. Ft.	(J) Volume Manure Tons	(K) Volume Manure Gallons			
222,456 A.U.D.	*1.15 cu.ft / A.U.	255,824.40 cu. ft.	7994.5 tons	1,918,683 gallons			

- H. 1.15 cu. ft. per A.U. varies from 1.70 cu. ft. per A.U. found in KYFOTG 590 table 1. This new factor of 1.15 cu. ft. per A.U. was determined as being more accurate during joint meeting of KY NRCS Ag Engineers, U.K. Extension Ag Engineers, U.K. Swine Specialist, and Tosh Farms Representatives held on 12-20-2005. Contact Doug Ovehults, U.K. Extension, Ag Engineeing specialist to verify.
- I. Total volume of liquid manure expressed in Cubic Feet. (1 cu. ft. of Liquid manure = 62.5 lbs or 7.5 gallons per cu. ft)
- J. Tons of Manure = Cu. Ft. x 62.5 lbs/cu. ft / 2000 lbs/ton
- K. Gallons of Manure = (cu. ft. x 7.5 gallons per cu. ft)

Part C. Water Added by Flushing, Wastage, or Cleaning							
(L)	(M)	(N)	(O)	(P)	(Q)		
Gal/head/day	No. Head	Days confinement	Gallons Added	Cu. Ft. Added	Tons Added		
*0.1 gal/head/day	4960 head	345 days	171,120 gallons	22,816 cu. ft	713 tons		

- L. 0.1 gal/head/day was determined to be more accurate during joint meeting of KY NRCS Ag Engineers, U.K. Extension Ag Engineers, U.K. Swine Specialist, and Tosh Farms Representatives held of 12/20/2005. Contact NRCS State Engineer, Billy Hartsel to verify.
- O. Gallons added = $L \times M \times N$
- P. Cu. ft = O (Gallons) divided by 7.5 (gallons per cu. ft)
- Q. Tons = $P(cu. ft) \times 62.5$ (lbs cu. ft) divided by 2000 (lbs per ton)

Part D. Total Volum	ne of Liquid Manu	re estimated to be Ger	nerated Per Confin	ement Period
(R)	(S)	(T)	(U)	(V)
Total Volume Manure Generated (cu. ft)	Total Volume Water Added (cu. ft)	Total Volume Liquid Waste Generated (R+S) (cu. ft)	Total Volume Liquid Waste Generated (Tons)	Total Volume Liquid Waste Generated (Gallons)
255,824.40 cu. ft	22,816 cu. ft	278,640.4 cu. ft	8,707.5 tons	Ans possibly the

- R. Total cu. ft manure from column I
- S. Total cu. ft water added from column P
- T. Total of R + S
- U. Total volume generated in cu. ft (column T) X 62.5 (lbs per cu. ft) divided by 2000 (lbs per ton)
- V. Total volume generated in cu. ft (column T) x 7.5 (gallons per cu .ft)



University of Kentucky Manure Test Report

Division of Regulatory Services

Lexington Lab 606-257-7355

Page 3

CARLISLE County Extension Office

Owner Charlie Cannon		Sample Identi	ification
980 St. Rt. 1772	107 10004	UK Lab No 91612	County Code 39
Arlington 270-655-5641	KY 42021	County ID	Owner ID 0001
Manure Type:	Swine Liquid	Received 11/9/2005	Reported 11/17/2005
Nutrient Results	(in lbs/1000gal)	41-32 - <u>28</u> per	1000 gallons = 4.17 tons
N 41	Zn 0.63	9.8 - 7.7 - 6	6.7 per ton
P2O5 32 ,	Cu 0.25		
K2O 28	Mn 0.24		ì
Ca 10			
Mg 7		·	
Nutrient	Injection Availability Coefficient	Plant Available Lbs/1000 gal	Plant Available lbs/Ton
Nitrogen _N	0.60	24.6 lbs	5.88 lbs
Phosphorus P205	0.80	25.6 lbs	6.16 lbs
Potassium K2O	1.00	28.0 lbs	6.7 lbs

Extension Agent

Information on land applying manure can be found in UK Extension publications ID-123, AGR-146 and 146A (poultry litter), and ASC-80 (swine manure).

Animal waste must be registered with the Division of Regulatory Services before being sold or offered for sale as a fertilizer.

For registration information contact: Dr. Dave L. Terry, Coordinator of Fertilizer Regulatory Program, University of Kentucky, 103 Regulatory Service Bldg,

<u>Appendix B - Page. 4 Estimating Nutrients Generated Per Confinement Period</u> from a Tosh Farms 2 barn operation

Part A. Estimated to	tal Nutrients Generated	d	
(A) Total Volume Liquid Waste Generated (Gallons)	(B) Nutrient	(C) U.K. Manure Test Report (lbs per 1000 gallons)	(D) Total Nutrients Generated (Lbs)
	Nitrogen (N)	41.0 lbs	85,681.92
	Phosphorus (P205)	32.0 lbs	66,873.69
• • • • • • • • • • • • • • • • • • • •	Potassium (K20)	28.0 lbs	58,514.48
2,089,803 Gallons	Calcium (Ca)	10.0 lbs	20,898.03
Callana/1000 2000 002	Magnesium (Mg)	7.0 lbs	14,628.62
Gallons/1000 = 2089.803	Zinc (Zn)	0.63 lbs	1,316.58
	Copper (Cu)	0.25 lbs	522.45
	Manganese (Mn)	0.24 lbs	501.55

- A. Total volume Liquid Waste Generated in Gallons comes from worksheet 1, column V.
- B. Nutrients analyzed by University of Kentucky Laboratory.
- C. See attached University of Kentucky Manure Test Report "Charlie Cannon" dated 11-17-05.
- D. Total nutrients generated = (A) divided by $1000 \times (C)$

Part B. Estimate	ed Total lbs of Available Nitrogen, Ph	osphorus and Po	tassium for Crop
(E) Nutrient	(F) Management	(G) Availability Coefficient	(H) Total Available Nutrients (lbs)
Nitrogen	Spring applied Incorporation 2 days or less	0.60	51,409.15
Phosphorus	Spring applied Incorporation 2 days of less	0.80	53,498.95
Potassium	Spring applied Incorporation 2 days of less	1.00	58,514.48

- E. Primary Plant Nutrients utilized by Corn, wheat and soybeans and Forage.
- F. Swine waste will be injected
- G. Source of Availability coefficient is KYFOTG Standard 590, Appendix A, Table 3.
- H. Total available nutrients for crop use is determined by multiplying (D x G)=H

Part C. Summary		
Loui Vanno et sinas Wetenis Cousiles son etimos e	ខាតា ស្រីពីពេកកាន់ពាធាតិមកដូច និង	Main Valuaca is mus Vistas s
278,640.4 cu. ft.	8,707.5 tons	2,089,803.0 gallons

Conversion Units

1 cu. ft. liquids = 62.5 lbs 1 cu. ft. liquids = 7.5 gallons 1 gallon = 8.34 lbs

1 Ton = 32 cu. ft. $\frac{1}{2}$ acre inch of Liquids = 27,000 gallons or 1815 cu. ft. or 56 tons

Appendix B – Page 5 "Determining Nutrient Based Plan Flow Chart"

Soil Samples from Crop fields have been tested using Mehlich III method. It was determined that <u>none</u> of the tested fields have a residual Soil Test Phosphorus (STP) Level greater than 400 lbs per acre.

(See Appendix C -- Soil Test by Tract/Field)

Application Year 1

KY NRCS FOTG 590 Option # 1 -- when STP are less than 400 lbs/ac

A Nitrogen (N) based plan will be implemented to meet the nutrient needs of

Corn according to University of Kentucky Fertilizer recommendation AGR-1.

(See KYFOTG Standard 590)

Application Year 2 and beyond Soil samples will be analyzed.

If STP levels are still <u>less than 400 lbs per acre</u> then; Option # 1 -- (Nitrogen based plan) will continue be implemented.

Application Year 2 and beyond
If STP levels are greater than 400 lbs per acre, then;
KY NRCS FOTG 590 Option # 2, Kentucky Phosphorus Index Rating will be used to determine nutrient application rates.

NRCS Phosphorus Index Rating

Low Risk (< 30 points) – (N) Based application continued

Medium Risk (30-60 points) – (N) Based application continued

High Risk (61 to 112 points) – (P) Based Crop Removal only

Very High Risk (>112 points) – NO APPLICATION

When Soil Test Phosphorus (STP) reaches 400 lbs/ac No manure will be applied to land with Phosphorus index (PI) rating greater than Medium.

NO APPLICATION on any field that Soil Test Phosphorus (STP) 1066 lbs/ac

Appendix B - Page No. 6cwb - Estimating Cropland needed to Utilize Nutrients

	ronomic Utili					id fice	ucu t t	Ctiliz	e i (dei lenes
	Crop that a					plied	l to		
meet nitro	ogen recor	nmendation	ons	basec	l on A	GR-	1 is;		Corn
Yields used bas	sed on 10 year a	verages, source	of da	ta N.A.S	.S.				
Other cro	ps grown	in rotatio	n th	at wi	ll also	rem	ove	W	heat &
applied n	utrients ar	e; (Crop Remov	val rate	es based o	n NRCS K	YFOTG	i 590)	So	ybeans
								1	
	2 Recommende s /A) for Corn pr				Soi	l Dra	inag	e Cla	SS
				Well d	lrained		Mod I draii	ned	Poorly drained
		entional Tilla	_ 1	100-14		14	10-175		175-200
Nitrogen recomn	Conse	ervation Tilla		125-16		D 1 *200		55 to 2	
Tituogen reconni	icidations in Ken	tucky are not base	cu on .	son anary.	sis out AO	K-1 ICCO	mmend	ations for	crop.
(A) Total Gallons (see Page 2)	(B) Total Lbs PAN (see analysis)	Produce: Amount	. 34			(D) num a rn nee B/C)		Ī	(E) plication Rate A / D)
2,089,803.0	51,409.15	133 1	lbs/a	С	386	.5 acre	es		William Vic
(F) Total Available Phosphorus (lbs) (see analysis)	(G) Total Available Phosphorus Applied (F/386.5 ac) (lbs/ac)	(H) 138.6 bu /ac Corn Phosphorus removal (lbs/ac)	Pho re	(I) 3 bu/ac Wheat osphorus emoval	37.5 Be Phosp rem	l) bu/ac ans bhorus oval	Phos remo Corn and	(K) lotal lo	(L) Estimated Available Phosphorus Carryover (G-K) (lbs/ac)
53,498.95	138.4 lbs	55.44 lbs	25.	15 lbs	26.2	5 lbs	106.	84 lbs	+31.56 lbs
(M) Total Available Potassium (lbs) (see analysis)	(N) Total Available Potassium Applied (M/386.5 ac) (lbs/ac)	(O) 138.6 bu /ac Corn Potassium removal (lbs/ac)	Po re	(P) 3 bu/ac Wheat tassium emoval	37.5 Be Potas rem	2) bu/ac ans ssium oval	Pots remo Co Whe B Rot	R) otal ssium oved by orn, at, and ean ation P+O	(S) Estimated Available Potassium Carryover (N-R) (lbs/ac)
58,514.48	151.4 lbs	48.51 lbs	15	.09 lbs	41.2	5 lbs		85 lbs	+46.55 lbs
17: I I I		**** *** *** *** *							

Nitrogen based plan was selected base on KY NRCS 590, Phosphorus Index option # 1 no fields have soil test phosphorus (STP) at or above 400 lbs/acre. Furthermore, there are no field which have a Phosphorus Index greater than a "medium hazard" which also allows Nitrogen based application of animal waste up to 1066 lbs STP.

				309 00000
Commodity	Year State	County	Yield	P205 (0.70) x 37.5 = 26.25 p 10mg
Soybeans	1998 Kentucky	Carlisle	34	
Soybeans	1999 Kentucky	Carlisle	22	1) = (112) x 37.5 = 41.25 K rengu
Soybeans	2000 Kentucky	Carlisle	40	K20 (1.10) X 37.5 = 41.25 K remov
Soybeans	2001 Kentucky	Carlisle	40	
Soybeans	2002 Kentucky	Carlisle	37	
Soybeans	2003 Kentucky	Carlisle	41	
Soybeans	2004 Kentucky	Carlisle	45	
Soybeans	2005 Kentucky	Carlisle	44	
Soybeans	2006 Kentucky	Carlisle	44	
Soybeans	2007 Kentucky	Carlisle	28	
-	Í			Divided by 10 years = 3755 bit/ac Everges

Source of Data USDA Nation Agricultural Stat Service N.A.S.S.

ommodity Year State Co	unty Yield	Corn	
ommounty real diale con			
orn For Grain 1999 Kentucky Car orn For Grain 2000 Kentucky Car orn For Grain 2001 Kentucky Car	lisle 154	K20 (0.35) X 138.6 =	55.44 rcma
orn For Grain 2006 Kentucky Carl orn For Grain 2007 Kentucky Carl	lisle 154 lisle 161		
	1386	Divided by 10 years = 1660 Nova ord space.	

Source of Data USDA Nation Agricultural Stat Service N.A.S.S.

Commodity	Year State County	' Yield	wheat
Wheat All	1998 Kentucky Carlisle	41	
Wheat All	1999 Kentucky Carlisle	42	D (50) × 50.3 = 25.15
Wheat All	2000 Kentucky Carlisle	50	P205 (.50) × 50.3 = 25.15
Wheat All	2001 Kentucky Carlisle	52	
Wheat All	2002 Kentucky Carlisle	50	1) (22) × 50.3 = 15.09
Wheat All	2003 Kentucky Carlisle	50	K20 (.30) X 50.3 = 15.09
Wheat All	2004 Kentucky Carlisle	51	
Wheat All	2005 Kentucky Carlisle	60	
Wheat All	2006 Kentucky Carlisle	60	
Wheat All	2007 Kentucky Carlisle	47	
	·	503 [Divided by 10 years = 50.5 00/20 20/20 20/20

Source of Data USDA National Agricultural Stat Service N.A.S.S.

Appendix B - Page. 7 -- Summary Record of planned Nutrient application for Corn in 2011

	386.5ac Corn Total 198 lbs	lbs	Total 198 lbs	011 / 631.		: 16511-6	Corn	386.5ac		711
						2011				
Medium	59 & 52		65 lbs	Injection	Anhy	May	Com	86.2 ac	1,2	3644
	1				Į	2011			4b,6,6a,	
Medium	26 to 84		65lbs	Injection	Anhv	Mav	Com	169.6	2,3,4,	886
Medium	45 to 90		65 lbs	Injection	Anhy	May 2011	Corn	130.7 (of 131.6)	1,2,4,6	412
Medium	59 & 52	5407	133 lbs	Injection	Liquid	April-May 2011	Corn	86.2 ac	1,2	3644
				:	1	2011			4b,6,6a,	
Medium	26 to 84	5407	133 lbs	Injection	Liquid	April-May	Com	169.6	2,3,4	886
Medium	45 to 90	5407	133 lbs	Injection	Liquid	April-May 2011	Com	130.7 (of 131.6)	1,2,4,6	412
ACKININA TAR		Needs								
	(lbs/ac)	Nitrogen	Per acre							
Crop unit	crop unit	obtain	Applied							
For this	for this	5	To be					Unit	crop unit	
Rating	(STP)	required	Nitrogen		Waste	application	Crop	Crop	make up	
Index	Phosphorus	of waste	of	method	of	Waste	using	Of	That	(Tract)
Phosphorus	Test	per acre	Amount	Application	Form	Of	Nitrogen	Acres	Numbers	Ħ.
NRCS	Soil	Gallons	Planned			Timing		Total	Field	Farm

applied from commercial fertilizer source lbs/ac of Plant Available Nitrogen. Anhydrous Ammonia will then be side dressed at a rate of 65. lbs. No additional P or K will be Landowner has chosen to apply Swine waste at a uniform rate over all 386.5 acres of corn. This should result in approximately 133 onservation images is ros iostac up to zoo jostac of windsen for com using conservation images

Corn planted Spring 2011 after Double crop Beans harvested in NOV 2010

Appendix B - Page. 8 -- Summary Record of planned Commercial Fertilizer application to Wheat in 2012

University chosen the		3644 1	688 2 4	412 1	rm D. act)
of Kentuck lower rate o		1,2	2,3,4 4b,6,6a,	1,2,4,6	Field Numbers That make up crop unit
y Recomm of 90 lbs/ao		86.2 ac∽	169.6~	130.7 _c of 131.6	Total Acres Of Crop Unit
endation (A c. Urea is 4		Wheat	Wheat	Wheat	Nitrogen using Crop
GR-1) is to a 12% nitrogen.		Feb-March 2012	Feb-March 2012	Feb-March 2012	Timing Of Waste application
pply 90 to NO Ad		Urea	Urea	Urea	Form of Waste
) 120 lbs of Nit ditional P or K		Broadcast	Broadcast	Broadcast	Application method
rogen for W will be app		90 lbs	90 lbs	90 lbs	Planned Amount of Nitrogen To be Applied Per acre
heat produc lied other th		214 lbs	214 lbs	214 lbs	lbs per acre required to obtain Nitrogen Needs
University of Kentucky Recommendation (AGR-1) is to apply 90 to 120 lbs of Nitrogen for Wheat production. The landowner has chosen the lower rate of 90 lbs/ac. Urea is 42% nitrogen. NO Additional P or K will be applied other than from Swine Waste.		59 & 52	26 to 84	45 to 90	Soil Test Phosphorus (STP) for this crop unit (lbs/ac)
owner has Waste.		Medium	Medium	Medium	NRCS Phosphorus Index Rating For this Crop unit

* Wheat No-Tilled in oct 2011 after Corn harvest

Appendix B - Page. 9 -- Summary Record of planned Nutrient application for Corn in 2012

		lbs	Total 198 lbs				Corn	386.5 ac		
Medium	19.6		65 lbs/ac	Injection	Anhy	May 2012	Corn	34.7	1,2	4017
Medium	22 to 42		65 lbs/ac	Injection	Anhy	May 2012	Corn	162.0 of 162.4	1,2,3,4,5,6,7,8 ,9, 10,11,20	690
Medium	60.25		65 lbs/ac	Injection	Anhy	May 2012	Corn	14.6	1	687
Medium	26 to 84		65 lbs/ac	Injection	Anhy	May 2012	Com	83.1	1,2,3,5	659
Medium	26 to 83.5		65 lbs/ac	Injection	Anhy	May 2012	Com	92.1	1,2,3,4,5, 6,7	414
Medium	19.6	5407	133 lbs	Injection	Liquid	April-May 2012	Com	34.7 ~	1,2	4017
Medium	22 to 42	5407	133 lbs	Injection	Liquid	April-May 2012	Com	162.0 ~ of 162.4	1,2,3,4,5,6,7,8 ,9, 10,11,20	690
Medium	60.25	5407	133 lbs	Injection	Liquid	April-May 2012	Com	14.6~	—	687
Medium	26 to 84	5407	133 lbs	Injection	Liquid	April-May 2012	Com	83.1~	1,2,3,5	659
Medium	26 to 83.5	5407	133 lbs	Injection	Liquid	April-May 2012	Corn	92.1 ~	1,2,3,4,5, 6,7	414
ror this Crop unit	ior this crop unit (lbs/ac)	Nitrogen Needs	Appueu Per acre		E S					
NRCS Phosphorus Index Rating	Soil Test Phosphorus (STP)	Gallons per acre of waste required to	Amountof Nitrogen To be	Application method	Form of Waste	Timing Of Waste application	Nitrogen using Crop	Total Acres Of Crop	Field Numbers That make up crop	Farm ID. (Tract)

CORN plants April-may of 2012 aft Double Crop beans havestel NOV 2011

Appendix B - Page. 10 -- Summary Record of planned Commerical fertilizer application for Wheat in 2013

owner has Waste.	University of Kentucky Recommendation (AGR-1) is to apply 90 to 120 lbs of Nitrogen for Wheat production. The landowner has chosen the lower rate of 90 lbs/ac. Urea is 42% nitrogen. NO Additional P or K will be applied other than from Swine Waste.	heat produc lied other th	trogen for W will be app	o 120 lbs of Ni lditional P or K	pply 90 to NO Ad	AGR-1) is to a 42% nitrogen.	nendation (, uc. Urea is	ky Recomr of 90 lbs/z	y of Kentuc e lower rate	Universit chosen th
Medium	19.0	220	30 10S	broadcast	Orea	2013	wneat	34./	1,2	401/
Medium	22 to 42	226	90 lbs	Broadcast	Urea	Feb-March 2013	Wheat	160 of 162.4	1,2,3,4,5, 6,7,8,9, 10,11,20	690
Medium	60.25	226	90 lbs	Broadcast	Urea	Feb-March 2013	Wheat	14.6	1	687
Medium	26 to 84	226	90 lbs	Broadcast	Urea	Feb-March 2013	Wheat	83.1	1,2,3,5	659
Medium	26 to 83.5	226	90 lbs	Broadcast	Urea	Feb-March 2013	Wheat	92.1	1,2,3,4,5, 6,7	414
Crop unit	crop unit	obtain Nitrogen	Per acre					Unit	crop unit	
Phosphorus Index Rating For this	Test Phosphorus (STP) for this	acre of waste required	of Nitrogen To be Applied	Application method	Form of Waste	Timing Of Waste application	Nitrogen using Crop	Total Acres Of Crop	Field Numbers That make up	Farm ID. (Tract)

What No-7: Heel in oct 2012 after com havest.

Appendix B - Page. 11 -- Summary Record of planned Nutrient application for Corn in 2013

		bs	Total 198 lbs				Corn	386.5ac		
Medium	59 & 52		65 lbs	Injection	Anhy	May 2011	Corn	86.2 ac	1,2	3644
Medium	26 to 84		65lbs	Injection	Anhy	May 2011	Corn	169.6	2,3,4, 4b,6,6a,	688
Medium	45 to 90		65 lbs	Injection	Anhy	May 2011	Corn	130.7 (of 131.6)	1,2,4,6	412
Medium	59 & 52	5407	133 lbs	Injection	Liquid	April 2013	Com	86.2 ac	1,2	3644
Medium	26 to 84	5407	133 lbs	Injection	Liquid	April 2013	Corn	169.6	2,3,4, 4b,6,6a,	688
Medium	45 to 90	5407	133 lbs	Injection	Liquid	April 2013	Corn	130.7 (of 131.6)	1,2,4,6	412
Crop unit	crop unit (lbs/ac)	obtain Nitrogen Needs	Applied Per acre							
NRCS Phosphorus Index Rating For this	Soil Test Phosphorus (STP) for this	Gallons per acre of waste required to	Planned Amount of Nitrogen To be	Application method	Form of Waste	Timing Of Waste application	Nitrogen using Crop	Total Acres Of Crop Unit	Field Numbers That make up crop unit	Farm ID. (Tract)

applied from commercial fertilizer source Landowner has chosen to apply Swine waste at a uniform rate over all 386.5 acres of corn. This should result in approximately 133 lbs/ac of Plant Available Nitrogen. Anhydrous Ammonia will then be side dressed at a rate of 65 .lbs. No additional P or K will be

CORN planted spring 2013 after Double crop bean harrested in wow 201 0

Appendix E - Page. 12 -- Operators Record of Nutrients application to Wheat in 2014

Medium	59 & 52	None	90 lbs	Broadcast	Urea	Feb-March 2014	Wheat	86.2 ac	1,2	3644
Medium	26 to 84	None	90 lbs	Broadcast	Urea	Feb-March 2014	Wheat	169.6	2,3,4, 4b,6,6a,	688
Medium	45 to 90	None	90 lbs	Broadcast	Urea	Feb-March 2014	Wheat	130.7 of 131.6	1,2,4,6	412
NRCS Phosphorus Index Rating For this Crop unit	Soil Test Phosphorus (STP) for this crop unit (lbs/ac)	Gallons Per Acre Of Swine Waste Applied	Lbs Per Acre Of Nitrogen Applied	Application method	Form of Waste	Timing Of Waste application	Nitrogen using Crop	Total Acres Of Crop Unit	Field Numbers That make up crop unit	Farm ID. (Tract)

What No Till in oct 2013 after Corn harvest.

Appendix B - Page. 13 -- Summary Record of planned Nutrient application for Corn in 2014

		bs	Total 198 lbs	injection	all	2014	Corn	386.5 ac		
Medium	19.6		65 lbs/ac	Injection	Anhy	May 2014	Corn	34.7	1,2	4017
Medium	22 to 42		65 lbs/ac	Injection	Anhy	May 2014	Corn	162.0 of 162.4	1,2,3,4,5,6,7,8 ,9, 10,11,20	690
Medium	60.25		65 lbs/ac	Injection	Anhy	May 2014	Com	14.6	1	687
Medium	26 to 84		65 lbs/ac	Injection	Anhy	May 2014	Com	83.1	1,2,3,5	659
Medium	26 to 83.5		65 lbs/ac	Injection	Anhy	May 2014	Com	92.1	1,2,3,4,5, 6,7	414
Medium	19.6	5407	133 lbs	Injection	Liquid	April 2014	Com	34.7	1,2	4017
Medium	22 to 42	5407	133 lbs	Injection	Liquid	April 2014	Corn	162.0 of 162.4	1,2,3,4,5,6,7,8 ,9, 10,11,20	690
Medium	60.25	5407	133 lbs	Injection	Liquid	April 2014	Corn	14.6		687
Medium	26 to 84	5407	133 lbs	Injection	Liquid	April 2014	Corn	83.1	1,2,3,5	659
Medium	26 to 83.5	5407	133 lbs	Injection	Liquid	April 2014	Corn	92.1	1,2,3,4,5, 6,7	414
NRCS Phosphorus Index Rating For this Crop unit	Soil Test Phosphorus (STP) for this crop unit (lbs/ac)	Gallons per acre of waste required to obtain Nitrogen Needs	Amountof Nitrogen To be Applied Per acre	Application method	Form of Waste	Timing Of Waste application	Nitrogen using Crop	Total Acres Of Crop Unit	Field Numbers That make up crop unit	Farm ID. (Tract)

Corn planted spring 2014 after touble crop surpliers Harvested NOV 2013.

COMPREHENSIVE NUTRIENT MANAGEMENT PLAN (CNMP) FOR

STEVE CANNON

APPENDIX C

- Land Application Location Map Year 1 & 3
- Conservation Plan Maps T-412, 688, & 3644
- Soil Maps
- Soil Description
- Conservation Plan
- RULSE 2 Worksheet
- KY NRCS Phosphorus Index worksheet
- Soil Test Report Spreadsheet
- NEPA Documentation
- Land Application Location Map Year 2 & 4
- Conservation Plan Maps T-414, 659, 687, 690, 4016-4017
- Soil Maps
- Soil Description
- Conservation Plan
- RULSE 2 Worksheet
- KY NRCS Phosphorus Index worksheet
- Soil Test Report Spreadsheet
- NEPA Documentation

CERTIFICATION OF PARTICIPANTS

CERTIFICATION OF:

DISTRICT CONSERVATIONIST

CONSERVATION DISTRICT

HANN X. PROUDE 4-28-09
CARLISLE COUNTY DATE

PUBLIC BURDEN STATEMENT

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collections is 0578-0013. The time required to complete this information collection is estimated to average 45/0.75 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection information.

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Location Map

Agency: USDA
Bardwell NRCS Office

State: Kentucky

Conservation District: Cartisle County

Assisted By: Todd Templeton Date: 11/19/2007

OWNER/OPERATOR: STEVE CANNON

CARLISLE CO. Farm Service Agency TRACTS 412, 688, & 3644



- Tract Boundaries
- US HWY
- EXPRESSWAY
- MAJOR ROAD
- Swine Feed Facility

CMNP Application Year 1 & 3

1 inch equals 2,000 feet



1,100 0 1,100 2,200 3,300 4,400 Feet



Conservation Plan Map

Date: 4/16/2008

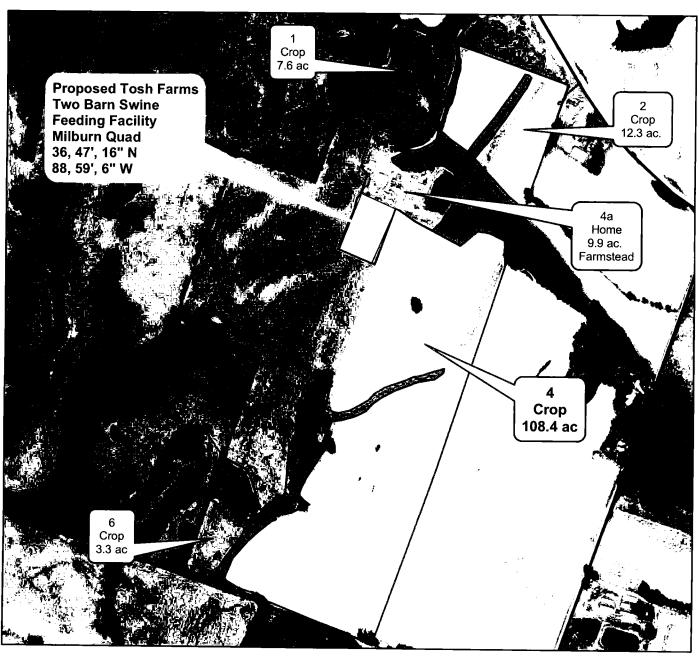
Customer(s): STEVE CANNON
District: Graves County Cons. District

Approximate Acres: 162.3

Legal Description: FSN-2241, Tract-412

Field Office: MAYFIELD SERVICE CENTER

Agency: USDA - NRCS
Assisted By: Tommy Reddick
State and County: KY, HICKMAN



Legend

- Consplan_T_412
- Swine Feed Facility
- Waterway
- Filter Strips
- Primary Roads
- Local Roads

1 inch equals 660 feet







SOIL MAP

Date: 3/24/2008

Customer(s): STEVE CANNON

District: BARDWELL SOIL & WATER CONSERVATION DISTRICT

Legal Description: FSN-2241 T- 412

Field Office: BARDWELL SERVICE CENTER
Agency: Natural Resources Conservation Service
Assisted By: Tommy L Reddick
State and County: KY, CARLISLE



Legend

soil_a_ky039

Tract 412

-- Streams_ky039

Carlisle Co primary Roads

Carlisle Co Local Roads

quads24k_a_ky039





Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Ad - Adler silt loam, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soil that is subject to flooding in winter and spring. Seasonal water table at about 2 feet.

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoB3 - Loring silt loam, 2 to 6 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Workability is fair and yield potential is low.

Map Unit: LoC3 - Loring silt loam, 6 to 12 percent slopes, severely eroded

Description Category: SOI

Upland soil with a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Low yield potential. Best suited to pasture and hay.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

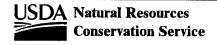
Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: LsE3 - Loring-Memphis-Saffell complex, 12 to 30 percent slopes, severely eroded

Description Category: SOI

Moderately deep and deep soils on uplands. Fragipan in Loring soils at a depth of about 1 foot slows water movement and restricts roots. Saffell soils are underlain with very gravelly material. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007



BARDWELL PROGRAM DELIVERY POINT 140 STATE ROUTE 123

Resources BARDWELL, KY 42023-8734 Conservation Service

(270) 628-5453

MARK CLAXTON DISTRICT CONSERVATIONIST

Conservation Plan

STEVE CANNON **331 COUNTY ROAD 1232** ARLINGTON, KY 42021

Comprehensive Nutrient Management Plan (CNMP)

Tract: 412

Comprehensive Nutrient Management Plan - Applied: (103)

A Comprehensive Nutrient Management Plan (CNMP) that addresses the temporary storage and application of animal waste has been fully applied according to KY FOTG Standard Nutrient Management 590.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
4a	1 no	4	2012		
Total:	1 no				

Comprehensive Nutrient Management Plan - Written: (102)

A Comprehensive Nutrient Management Plan (CNMP) that addresses the temporary storage and application of animal waste has been developed according to KY FOTG Standard Nutrient Management 590.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
4a	1 no	4	2009		
Total:	1 no				

Waste Storage Facility: (313) NON- PRMS REPORTABLE

Swine waste will be collected and temporarily stored in concrete Holding pits located beneath slated feeding floors. Concrete pits will be constructed according to a license professional engineer and KYDOW approved design. Swine waste will be land applied according to Comprehensive nutrient managment plan (CNMP). Site Approval and construction permit must be obtained from Kentucky Division of Water.

Field	Planned Amount	Month	Year	Applied Amount	Date
4a	2 no	4	2010	Amount	Date
Total:	2 no			·	



BARDWELL PROGRAM DELIVERY POINT 140 STATE ROUTE 123

Conservation BARDWELL, KY 42023-8734 Resources Service

(270) 628-5453

MARK CLAXTON **DISTRICT CONSERVATIONIST**

Conservation Plan

STEVE CANNON **331 COUNTY ROAD 1232** ARLINGTON, KY 42021

CNMP LAND APPLICATION YEAR 1 & 3

Tract: 412

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

See enclosed Revised Universal Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	7.6 ac	4	2010-2014		
2	12.3 ac	4	2010-2014		
4	108.4 ac	4	2010-2014		
6	2.4 ac	4	2010-2014		1
Total:	130.7 ac				

Nutrient Management: (590)

Crop nutrient needs will be obtained from application of Animal waste and commercial fertilizer according to comprehensive nutrient management plan.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	7.6 ac	4	2011&2013		
2	12.3 ac	4	2011&2013		
4	108.4 ac	4	2011&2013		
6	2.4 ac	4	2011&2013		1
Total:	130.7 ac				<u> </u>

Residue and Tillage Management, Mulch Till: (345)

Corn will be planted using residue and tillage management, mulch-till (345).

After swine waste has been injected, seedbed for corn will be prepared by lightly running a full width tillage implements such as phillips harrow or field cultivator. See the Revised Universal Soil Loss Equation (RUSLE2) erosion record(s) for the tillage operations necessary to obtain residue amounts needed to meet plan soil loss objectives.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	7.6 ac	4	2011&2013		
2	12.3 ac	4	2011&2013		
4	108.4 ac	4	2011&2013		
6	2.4 ac	4	2011&2013		
Total:	130.7 ac				

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	7.6 ac	10	2011-2014		
2	12.3 ac	10	2011-2014		
4	108.4 ac	10	2011-2014		
6	2.4 ac	10	2011-2014		
Total:	130.7 ac				†



Tract: 412

Filter Strip: (393)

Filter Strips (393) consisting of introduced grasses and legumes will be established for the primary purpose of protecting surface waters adjacent to cropland from Ag runoff of Sediments, Pesticides and Nutrients. Filter Strip will be established according NRCS Job Sheet CRP-JS-CP-21 and managed and maintained for duration of contract according to KY-NRCS-JS-CRP Management / Maintenance Job Sheet.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
3a	0.4 ac	9	2003	0.4 ac	9/1/2004
3b	0.7 ac	9	2003	0.7 ac	9/1/2004
5b	0.4 ac	9	2003	0.4 ac	9/1/2004
5c	0.5 ac	9	2003	0.5 ac	9/1/2004
Total:	2 ac			2 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
3a	0.4 ac	9	2003	0.4 ac	9/1/2004
3b	0.7 ac	9	2003	0.7 ac	9/1/2004
5b	0.4 ac	9	2003	0.4 ac	9/1/2004
5c	0.5 ac	9	2003	0.5 ac	9/1/2004
Total:	2 ac			2 ac	<u> </u>



Tract: 412

Grade Stabilization Structure: (410)

A Grade Stabilization Stucture (410) will be installed according to NRCS Standards and specifications and maintained for the duration of the CRP contract.

Planned Field Amount Montl			Applied nth Year Amount D			
3c	1 no	9	2003	1 no	9/1/2004	
5a	1 no	9	2003	1 no	9/1/2004	
Total:	2 no			2 no		

Grassed Waterway: (412)

Grassed waterway will be constructed and established according to NRCS design and maintained according to KY-NRCS-JS-CRP Management /Maintenance Job Sheet.

Field	Planned Amount	Month	Year	Applied Amount	Date
3с	1.2 ac	9	2003	1.2 ac	9/1/2004
5a	1 ac	9	2003	1 ac	9/1/2004
Total:	2.2 ac			2.2 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

Field	Planned Amount	Month	Year	Applied Amount	Date	
3c	1.2 ac	9	2003	1.2 ac	9/1/2004	
5a	1 ac	9	2003	1 ac	9/1/2004	
Total:	2.2 ac			2.2 ac		



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 412

Field(s) No: 1,2,4,6

Location	Soil	Slope length (horiz)	Avg. slope steepness, %
Kentucky\Carlisle County	LoC3 Loring silt loam, 6 to 12 percent slopes, severely eroded\Loring silt loam 85%	150	8.0

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	· Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7		6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence	, g	57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)	00071011-1	79
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		
6/23	Sprayer, kill crop		96
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95 95
7/15	Herbicide - GMO post emergence		02
8/15	Herbicide – GMO post emergence		93
9/15	Herbicide - GMO post emergence		89
11/20	Harvest, killing crop 20pct standing stubble		85 95

Page 1 of 2

(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan		KY Phosphorus Index rating w/planned practices		Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.55	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

Fuel type for entire run	Fuel cost for entire simulation, US\$/ac
Diesel	\$33.20/ac

Soil conditioning index	(SCI)			
+0.26				

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg. an	nual si	ope	STIR
	20.0		

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

	KE	NTUCKY P	HOSP	HORL	IS INDE	IOW X	RKSHE	ET:		
Farm:			2241				Date:	Δ	April 9, 2008	3
Tract:			412							
					FIELD F		EVALUE R or 8 points)	ATINGS		
			Field #:	1	Acres:	7.6	Field #:	2	_ Acres:	12.3
Field Fe	atures	Weighted Factor (WF)	Existing Value	WF x Existing Value	Flanned Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Sc	oil Group	1	4	4	4	4	1	1	4	4
2. Residual Soil	Test (P)	3	1	3	1	3	1	3	1	3
3. Field Slope P	ercent	1	4	4	4	4	4	4	4	4
4. Land Cover P	ercent	3	4	12	1 1	3	4	12	1 1	3
5. Vegetative Bu	uffer Width	3	8	24	1	3	8	24	1	3
6. Ag. Impaired	Watershed	1	1	1	1	1	1	1	1	1
7. Application Ti	iming	3	4	12	2	6	4	12	2	6
8. Application M	ethod	3	8	24	1	3	8	24	1	3
9. Distance To V	Naterbody	2	4	8	4	8	4	8	4	8
10. MLRA Locati	on	1	2	2	2	2	2	2	2	2
FIELD FEATURE TOTALS	ES INDEX		Existing Total*	94	Planned Total	37	Existing Total*	91	Planned Total	37

Note: If existing total results in a "Low" or "Medium" rating, a nitrogen, or phosphorus based nutrient management plan may be implemented.

	Field Vulnerability for Phosphorus Loss
Total Points from Points	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

KI	ENTUCKY I	PHOSI	PHOR	US INDI	EX W	ORKSHE	EET .		
Farm:		2241				Date		April 9, 200	8
Tract:		412					A.A.		
				FIELD		RE VALUE , or 8 points		S	
		Field#	:4	Acres:	108.4	Field#	: 6	Acres:	3,3
Field Features	Weighted Factor (WF)	Existing Välue	WF > Existin Value	e Flamed	WF x Planne Value	d Existing	WF x Existin Value	9 Hanned.	WF x Planne Value
Hydrologic Soil Group	1	4	4	4	4	4	4	4	4
2. Residual Soil Test (P)	3	1	3	1	3	1	3	1	3
3. Field Slope Percent	1	4	4	4	4	4	4	4	4
Land Cover Percent	3	4	12	1	3	4	12		3
. Vegetative Buffer Width	3	8	24	1	3	8	24	8	24
. Ag. Impaired Watershed	1	1	1		1	1	1	1	- - 29 1
. Application Timing	3	4	12	2	6	4	12	2	6
. Application Method	3	8	24	$\frac{1}{1}$	3	8	24	1	
. Distance To Waterbody	2	4	 8	4	8	2			3
0. MLRA Location	1	2	2	$\frac{1}{2}$	2	2	4 2	2 2	2
IELD FEATURES INDEX OTALS	The second secon	Existing Fotal*	94	Planned Total	37	Existing Total*	90	Planned Total	54

Note: If existing total results in a "Low" or "Medium" rating, a nitrogen, or phosphorus based nutrient management plan may be implemented.

Total Points from P	Field Vulnerability for Phosphorus Loss Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

Spectrum Analytic Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

Report To BARDWELL, KY 42023 2351 US 51N AGRI-CHEM

> Prepared For STEVE CANNON Account - AGRI-CHEM

Tested Sampled

09-28-2007 09-24-2007

						**5	OCHAPA OCHAPA			SC HOME 8AC-3; 2, # 1	SC HOME 8AC-2	SC HOME 8AC-1 1, 1, 1 B01366	Sample Number
			· · · · · · · · · · · · · · · · · · ·						B01369	B01368	B01367	B01366	Łab Number
		********							6.2		Ċī Çī	6.3 7.0	Soll Buffe
				j.						 1.8			Matter %
6 2 C C C C C C C C C C C C C C C C C C				7 . g	24.	7.55	20.78	₹४		99 G	108 H	64 M	Phosphorus Polassium
		47 153 163	107 144 170	i de la companya de l		# 22 24 28;	- 1		331 G	351 G	193 M	228 M	y gassina i
		1. E. E.						1 (1) 1 (2) 1 (2) 1 (3) 1 (4) 1 (4)		206 M	671 H	ഒ	бу unjsəйбен
								4	2835 H	2456 H	2115 M	3312 H	Calcium Ca
		444	18.7	- 15 - 15 - 15 - 15 - 15 - 15 - 15 - 15			i					10.3	CEC
			•		***********	***			4.4 10.3	6.0 11.5	2.1 23.4	2.8 16.9	ž vg
				7-					3 72.9	5 82.4	4 44.3	9 80.3	9
													Sulfur S
				4								•	Boron B
					•				ა <u>×</u>	4 G	3 X	ა <u>×</u>	Zinc Zn
												ı	Fig.
	- Self-se												Copper Cu
													Mang. Min
													Alum. Al

Streamon Home Fours & Auer on Steve Road just below house on right. Truck A12 Field O - Averily P. 90 W/AC

Ratings: L=Low M=Medium G=Good H=High V=Very High

K: Approx. 1N-NH4OAc lb/A = (M3-K * 0.84) * 2 Ca: Approx. 1N-NH4OAc lb/A = (M3-Ca * 0.75) * 2

Prepared For

Spectrum Analytic Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

BARDWELL, KY AGRI-CHEM Report to 2351 US 51N

> STEVE CANNON Account - AGRI-CHEM

> > Sampled Tested 09-28-2007 09-24-2007

SC HOME WEST-9 SC HOME WEST-3 SC HOME WEST-2 SC HOME WEST-16 SC HOME WEST-15 SC HOME WEST-14 SC HOME SC HOME WEST-12 SC HOME WEST-11 SC HOME WEST-1 SC HOME WEST-10 SC HOME WEST-5 SC HOME WEST-4 **SC HOME WEST-8** *C HOME WEST-6 HOME WEST-7 Sämple Number WEST-13 B01335 B01334 B01333 801331 801346 B01345 B01344 B01343 B01342 B01341 B01340 B01339 B01338 B01337 B01336 B01332 Lab Number 4.9 6.1 5.7 6.7 ව ව ව 6.0 6.2 5.7 5.8 . Д 5.7 5.3 56 6.8 6.7 6.3 6.5 6.8 8.0 6.7 6.9 6.8 6.9 6.6 7.1 6.7 2.4 . 5 41 N 24-L 45 M 42 M 57 M 28 L 32 24 L 95 G 31 L 71.G 28 251 78 G 205 M 180 M 166 M 114 L 175 M 165 M 170 M 143 M 252 M 181 M 170 M 124 M 143 M 176 M 123 L 341 M 283 M 537 G <u>4</u> 5 231 M 232 M 245 M 150 M 702 H 143 M 84 F 128 M 6 3837 H 2940 G 1925 G 2400 H 3116 H 2366 M 3216 H 2576 G 3221 H 2283 G 2402 H 2757 G 3177 G 1802 M 1964 G <u>-</u> 13.8 22 10.2 5.4 13.8 12.0 10.8 13.2 <u>သ</u> ယ 93 9.8 8.6 8.0 25 2.7 1.9 10.7 12.5 10.4 24.4 10.0 14.6 8.3 <u>.</u>0 4.1 9.6 6.7 5.2 6.7 75.5 51.9 42.8 53.7 66.0 52.3 59.8 69.7 69.6 76.5 50.1 59.5 29.3 74.5 77.3 Sulfur Boton Zinc ω 2 **Σ Σ** ___ ა ≰ 2 ა ≰ ა ≰ ა ≰ 2 **≤** 2 ___ <u>--</u> 21 <u>→</u> 3 Mehrich-3 PPM and Rating a g Copper Mang. Mn Alum.

Results: P, K, Mg and Ca are extracted by Mehlich-3 (ICP) and are reported as follows: Ratings: L=Low M=Medium G=Good H=High V=Very High

Mg: Approx. 1N-NH4OAc ib/A = (M3-Mg * 0.88) * 2 Ca: Approx. 1N-NH4OAc ib/A = (M3-Ca * 0.75) * 2

Tract 012 Truct A12 Field 01:23 SPIS S-16 T T 30 * įì 45.5 145 MAC The The T

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Client: Steve Cannon

Farm/Tract: T-412

Prepared by: TOMMY L. REDDICK, SCT Date: 3-25-08

		ANIMALS							PLANTS				AR R									•				WATER	,				***		-		o O I	200
	Mat	Habitat			Mgt.		Condition		Sultability	Condition			Quality										Quality			Quantity	Deposition			Condition	•				Erosion	
Animal Health - Poisonous plants, disease, parasites, insects	Population/Resource Balance	Food, Cover, Shelter & Quantity/Quality of Water	Pests	Nutrients	Establishment - Growth - Harvest	Health and Vigor	Productivity - Kinds, Amounts, Distribution	Intended Use	Adapted to site - soll/climate	Air Temberature, Movement, Humidity	Airborne Odors	Airborne Chemical Drift - on-site & off-site	Airborne Sediment and Smoke - on-site & off-site	Aquatic Habitat	Temperature	Low: Dissolved Oxygen	Suspended Sediments	Pathogens - Calls -	Numeris & Organics	Suitace water Contaminants Pesticites	Heavy Metale - Oake		Groundwater Contaminants Pesticides	Restriction from Sediment Deposition on-site & off-site (drainage ditches mad ditches culvers waternoties streams 1966)	Inadequate Outlets	Excess - Flooding/Ponding - Subsurface - Seeps	Damage and Sarety - on-site & off-site	Animal Waste or Other Organics	Compaction	Firth - Crusting - Water Infiltration - Organic Matter	Soil Mass Movement (hillsides, slippage or slope failures)	Stream Bank	Classic Gully (Channel needs to be stabilized)	Epremeral Gully/Concentrated flow (usually eliminated by tillage)	Uneat & Xuii	
				1,2,4,6								1,2,4,6							1,2,4,6	1,2,4,6									1,2,4,6	1,2,4,6				1,2,4,6	1,2,4,6	Spirat

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

							-
				e arang	Kaconale supporting the intuing	onale su	2
		The action will be referred to the State Office	r FIS The action	may require preparation of an EA or EIS	nav realisira	.	
	quired.	has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required	in existing NRCS	ufficiently analyzed in a	as been s e		×
ditional analysis is	ces. No add	is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.	ther environmenta	ically excluded from fur d.	s categori required		
		juired.	nal analysis is req	is not a federal action. No additional analysis is required	s not a fec		
s; the Special I find, for the	nsiderations S-CPA-52.	Findings. I have considered the effects of this action and the alternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary dircumstances criteria in the instructions for form NRCS-CPA-52. I find, for the reasons stated below, that the selected alternative:	action and the alto e extraordinary di elected alternative	ve considered the effects of this action and the alte Environmental Concerns; and the extraordinary cin reasons stated below, that the selected alternative:	have cons Environ reasons	dings. i	3
	e		Title		NRCS	Signature	Sig
Đ	-25-07	W	So		II.	l/k	
e ;	(check one)	Office Records;X_ Both	e field review;	bove is based on:	Information above is	Inform	ਜ਼
	ź	irements?	for permit requi	11a. Nestusin loss of nocoparin capacity? 11a. Owner addised to contact DOW for permit requirements?	wner ad	11a.C	
	z	To.: The spirite of injuries in regulation in crease regulation by residents according to anticit COE & DOW or other authority concerning BMPs or permit requirements?	intact COE & Do	Fyes, landowner advised to co BMPs or permit requirements?	If Yes, lar	10a	
	z	Located adjacent to any state designated special use waters (Sect 1:FOTG)?	esignated speci	idjacent to any state-o	ocated a	1	St
	z	8a. Negatively impact federally designated wild or scenic river? (Permit may be required)	gnated wild or s	Negatively impact federally designated wild or scenic river? (Perr	vegatively	15.5	PÈL
	Z Z	CR Review requires field investigation by qualified archaeologist/SHPO consultation? (Further action is required)	gation by qualifi	CR Review requires field invest (Further action is required)	R Revie	» 7	AL EN
	z	CR review conducted by qualified individual results in "Undertaking Reviewed" (No further action is required)	ad individual res	(No further action is required)	(No furth	78	IVIP
	z	Contain any practices considered as PG or G (CR Matrix, Sect I FOTG)?	ered as PG or (any practices consid	ontain a	1.7	ONI
		If Yes, owner advised to contact COE & DOW for permit requirements?	LCOE & DOW for	mer advised to contac	If Yes, owner advi	g	MEV
	z	Result in the modification of a stream channel, or fill material being placed in any navigable water or tributance	ream channel, o	he modification of a st	esult in the	6	ΙΤΔΙ
-		If Yes, landowner advised of Food Security Act requirements and advised to contact COE & DOW concerning permit requirements?	od Security Act ments?	If Yes, landowner advised of Food Secu	fYes, lan OW con	Şī a	CO
	z	Change hydrology, deposit fill, or remove stumps from wetlands (W, FW, FWP) or PCs that have been abandoned?	r remove stump	Change hydrology; deposit fill, c have been abandoned?	hange hy lave beer	Ģn	NCE
ALL	3	The construction of the co	ne, (-) adverse (), USFW/S cons	The Anny Suspended III Educated () elicalighted Species, () Inellia Lise (+) positive, (0) neutralinone, (-) adverse (circle one) (If adverse effect is indicated, USFWS consultation Required)	Use (+) p		DNC
	z	13	a public contro	gh likelihood of causin	lave a hig	, 33 H	
	z	Include any earth disturbing activities near pipelines, electrical, or other utilities?	vities near pipeli	ny earth disturbing acti	nclude an		
	z	81	ınıque familand	/impact any prime or	legatively	1 Z	
FIFI DS	(V/N)	Special Environmental Concerns (First Field Numbers for Yes Response)	CIAI Environme	Special Environmenta WILL THE PRACTICE/SYSTEM TO BE PLANNED:		M.	
		Environmental Justice Considered during planning?	Υ	Υ			
ion?	ental protect	Compatible with community well-being & environmental protection?	≺	₹ -	Social		,
	afetro	High Economic risk involved?	< z	< 2			
	ed?	Very high Operation and Management Level required?	z	T-:	Economic		
		Extensive Labor required?	z	z			
		Extensive Capital required?	Z	Z			*******
			LIFESPAN	INSTALLED	•	HUMAN	
A STATE OF THE PARTY OF THE PAR		CONSIDERATION	DURING	WHEN			***

Conservation Plan Map

Date: 4/16/2008

Customer(s): CARL E CANNON,

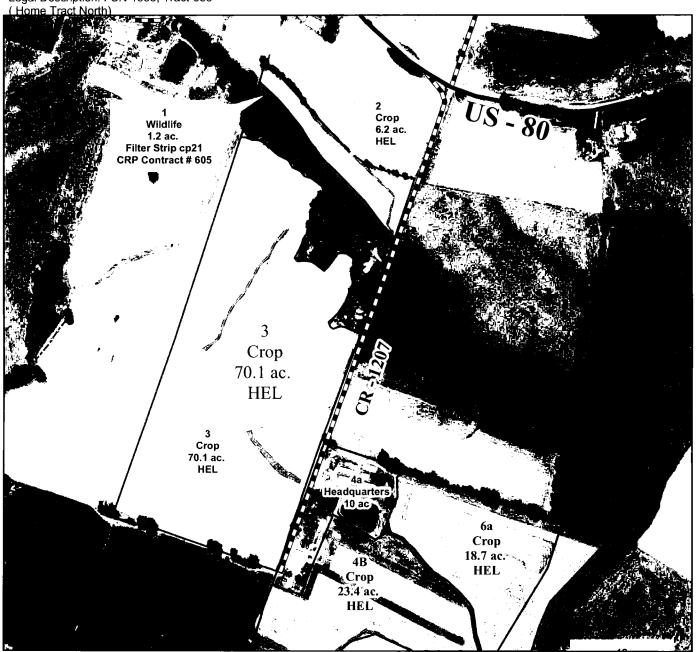
DISTRICT BARDWELL SOIL & WATER CONSERVATION DISTRICT

Approximate Acres: 338.7

Legal Description: FSN-1653, Tract-688

Field Office: BARDWELL SERVICE CENTER
Agency: Natural Resources Conservation Service

Assisted By: Tommy Reddick State and County: KY, HICKMAN



Legend

- Consplan_T_688
- Stream
- Water Way
- Filter Strip
- rdsprimary_I_ky039

1 inch equals 660 feet







SOIL MAP

Date: 3/24/2008

Customer(s): CARL E CANNON

District: Carlisle County Approximate Acres: 0

Legal Description: FSN-1653 T-688

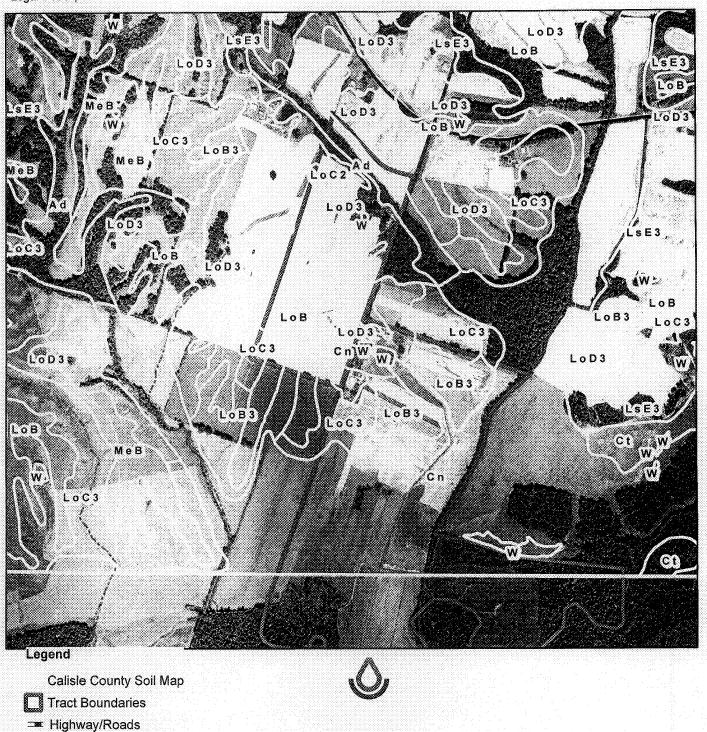
County Boundary - Primary Roads Local Roads

-- Streams

Field Office: BARDWELL PROGRAM DELIVERY POINT

Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE





1:15,404

Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Ad - Adler silt loam, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soil that is subject to flooding in winter and spring. Seasonal water table at about 2 feet.

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches,

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoB3 - Loring silt loam, 2 to 6 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Workability is fair and yield potential is low.

Map Unit: LoC2 - Loring silt loam, 6 to 12 percent slopes, eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability and moderate yield potential. Erodibility is very high.

Map Unit: LoC3 - Loring silt loam, 6 to 12 percent slopes, severely eroded

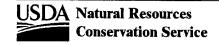
Description Category: SOI

Upland soil with a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Low yield potential. Best suited to pasture and hay.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007

Т	ra	C	f:	6	8	8

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

See enclosed Revised Univeral Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
2	6.2 ac	4	2010-2014		
3	70.1 ac	4	2010-2014		
4	31.3 ac	4	2010-2014		
4b	23.4 ac	4	2010-2014		
6	19.9 ac	4	2010-2014		
6a	18.7 ac	4	2010-2014		
Total:	169.6 ac				

Nutrient Management: (590)

Crop nutrient needs will be obtained from application of Animal waste and commercial fertilizer according to comprehensive nutrient management plan.

	Planned		·	Applied	
Field	Amount	Month	Year	Amount	Date
2	6.2 ac	4	2011&2013		
3	70.1 ac	4	2011&2013		
4	31.3 ac	4	2011&2013		
4b	23.4 ac	4	2011&2013		
6	19.9 ac	4	2011&2013		
6a	18.7 ac	4	2011&2013		
Total:	169.6 ac				



Corn will be planted using residue and tillage management, mulch-till (345).

After Swine waste has been injected, seedbed for corn will be prepared by lightly running a full width tillage implements such as phillips harrow or field cultivator. See the Revised Universal Soil Loss Equation (RUSLE2) erosion record(s) for the tillage operations necessary to obtain residue amounts needed to meet plan soil loss objectives.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
2	6.2 ac	4	2011&2013		
3	70.1 ac	4	2011&2013		
4	31.3 ac	4	2011&2013		
4b	23.4 ac	4	2011&2013		
6	19.9 ac	4	2011&2013		
6a	18.7 ac	4	2011&2013		
Total:	169.6 ac				

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
2	6.2 ac	10	2011-2014		
3	70.1 ac	10	2011-2014		
4	31.3 ac	10	2011-2014		
4b	23.4 ac	10	2011-2014		
6	19.9 ac	10	2011-2014		
6a	18.7 ac	10	2011-2014		
Total:	169.6 ac				

Tract: 688

Filter Strip: (393)

Filter Strips (393) consisting of introduced grasses and legumes will be established for the primary purpose of protecting surface waters adjacent to cropland from Ag runoff of Sediments, Pesticides and Nutrients. Filter Strip will be established according NRCS Job Sheet CRP-JS-CP-21 and managed and maintained for duration of contract according to KY-NRCS-JS-CRP Management / Maintenance Job Sheet.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	1.1 ac	3	2003	1.1 ac	10/30/2003
12	3.2 ac	9	2005	3.2 ac	4/5/2007
63	53.5 ac	9	2000	53.5 ac	9/14/2000
64	0.7 ac	9	2000	0.7 ac	10/1/2001
72	8 ac	9	1998	8 ac	10/1/1998
Total:	66.5 ac			66.5 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	1.1 ac	3	2003	1.1 ac	4/5/2007
12	3.2 ac	9	2005	3.2 ac	4/5/2007
63	53.5 ac	9	2000	53.2 ac	10/1/2001
64	0.7 ac	9	2000	0.7 ac	10/1/2001
72	8 ac	9	1998	8 ac	4/5/2007
Total:	66.5 ac			66.2 ac	



Bottomland -(Spring Inject LiquidManure + Disk)
 Followed by Conv Corn, Mulch Till Wheat (Disk2x,
 And broadcast wheat and No-till Double Crop beans.

** RUSEE2 Profile Enosion Galculation Record **

Operator – Steve Cannon Inputs:

Tract No: 688

Field No 2, $4\xi \varphi$

Location	Soil	Slope length (horiz)	Avg. slope steepness, %
Kentucky\Carlisle County	Cn Convent-Adler silt loams, frequently flooded\Convent silt loam 50%	300	0.75

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Corn, grain	bushels	140
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Wheat, winter, mid- south	Bushels	55
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Soybean, mw 15 - 20 in rows	bu	35

Contouring Strip		Diversion/terrace,	Subsurface	Adjust res.	General yield	Rock
		sediment basin	drainage	burial level	level	cover, %
a. rows up-and- down hill	Yes-33ft wide	(none)	(none)	Normal res. burial	NASS	0

Outputs:

T	Soil loss	Detachment on	Soil loss for	Sediment	Net C	Net K	Crit. slope	Surf. cover after
value	erod. portion	slope	cons. plan	delivery	factor	factor	length	planting, %
5.0	1.1	1.1	1.1	1.1	0.075	0.47		

Aprox Date (+/- 2 weeks)	Operation	Description	Surf. res. cov. after op, %
4/26		2522 gallons/ac	77
4/29	Disk, tandem secondary op.		39
4/30	Planter, double disk opnr	Corn, grain	39
5/15	Sprayer, Herbicide post emergence		34
9/20	Harvest, killing crop 20pct standing stubble		92
10/1	Disk, tandem light finishing		68
10/5	Disk, tandem light finishing		44
10/10	Planting, broadcast seeder	Wheat, winter, mid-south	43
3/15	Top Dress Wheat (Commercial Fertilizer)	See AGR-1	30
4/10	Sprayer, Herb post emergence		26
6/20	Harvest, killing crop 20pct standing stubble		92
6/23	Sprayer, kill crop		91
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	91
7/15	Sprayer, Herb post emergence		88
8/15	Sprayer, Herb post emergence		84
9/15	Sprayer, Herb post emergence		80
11/20	Harvest, killing crop 20pct standing stubble		94

Continue Page 2 of 2

FUEL USE EVALUATION:

Fuel type for entire	Equiv. diesel use for entire	Energy use for entire	Fuel cost for entire simulation,
run	simulation	simulation	US\$/ac
Diesel	9.7	1300000	32.9

SCI and STIR Output

Soil conditioning index (SCI)	Avg. annual slope STIR	Wind & irrigation-induced erosion for SCI, t/ac/yr
0.53	41.4	0

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Galculation Record

Operator - Steve Cannon

Tract No: 688

Field(s) No: 3 & 4 { 4 B

Location	Soil	Slope length (horiz)	Avg. slope steepness, %
Kentucky\Carlisle County	LoC3 Loring silt loam, 6 to 12 percent slopes, severely eroded\Loring silt loam 85%	150	8.0

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7		6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence		57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85
11/20	Harvest, killing crop 20pct standing stubble		95

Page 1 of 2

(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating w/planned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

Fuel type for entire run	Fuel cost for entire simulation, US\$/ac
Diesel	\$33.20/ac

Soil conditioning index	(SCI)
+0.26	

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg.	annual	slope	STIR
	20	.0	

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

4	KENTUCKY I	PHOSE	HORI	JS INDE	X WC	RKSHE	ET				
Farm:	Farm: 1653							April 9, 200	<u> </u>		
Tract:	Tract: 688				~~~						
				FIELD		RE VALUE F or 8 points)	VALUE RATINGS 8 points)				
		Field #	: 2	Acres:	6.2	Field #:	Field #: 3 Acres: 70.1				
Field Features	Weighted Factor (WF)	Existing Value	WE'x Existing Value		WF× Planne Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value		
Hydrologic Soil Group	1	2	2	2	2	4	4	4	4		
2. Residual Soil Test (P)	3	1	3	1	3	1	3	1 1	3		
3. Field Slope Percent	1	1	1	1	1	4	4	4	4		
4. Land Cover Percent	3	8	24	4	12	4	12	1	3		
5. Vegetative Buffer Width	3	8	24	1	3	8	24	8	24		
6. Ag. Impaired Watershe	d 1	1	1	1 1	1	1	1	1	1		
7. Application Timing	44 L 3	4	12	2	6	4	12	2	6		
8. Application Method	. 3	8	24	1	3	8	24	1	3		
9. Distance To Waterbody	2	4	8	4	8		2	1	2		
10. MLRA Location	. 1	2	2	2	2	2	2	2	2		
FIELD FEATURES INDEX FOTALS		Existing Total*	101	Planned Total	41	Existing Total*	88	Planned Total	52		

Note: If existing total results in a "Low" or "Medium" rating, a nitrogen, or phosphorus based nutrient management plan may be implemented.

	Field Vulnerability for Phosphorus Loss						
Total Points from P Index	Generalized Interpretation of P Index						
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.						
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.						
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.						
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.						

KE	NTUCKY F	HOSP	HORU	S INDE	X WOF	RKSHE	ET					
Farm:		1653		***************************************		Date:	A	pril 9, 200	<u> </u>			
Tract:		688		·								
		FIELD FEATURE VALUE RATINGS (1,2,4, or 8 points)										
		Field #:	4	Acres:	31.3	Field #:	6	. Acres:	19.9			
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value			
Hydrologic Soil Group	1	2	2	4	4	2	2	4	4			
Residual Soil Test (P)	3	1	3	1	3	1	3	1	3			
Field Slope Percent		1	1	1	1	1	1	1	1			
Land Cover Percent	3	8	24	2	6	8	24	2	6			
5. Vegetative Buffer Width	3	8	24	1	3	8	24	1	3			
6. Ag. Impaired Watershed	1	1	1	1	1	1	1	1	1			
7. Application Timing	3	4	12	2	6	4	12	2	6			
8. Application Method	3	4	12	1	3	4	12	1	3			
9. Distance To Waterbody	2	4	8	2	4	4	8	2.	4			
10. MLRA Location	1	2	2	2	2	2	2	2	2			

Note: If existing total results in a "Low" or "Medium" rating, a nitrogen, or phosphorus based nutrient management plan may be implemented.

89

Planned

Total

Existing

Total*

33

Planned

Total

33

89

Existing Total*

FIELD FEATURES INDEX

TOTALS

Field Vulnerability for Phosphorus Loss								
Total Points from P Index	Generalized Interpretation of P Index							
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.							
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.							
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.							
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.							

K	ENTUCKY P	PHOSP	HORU	S INDE	EX WOF	RKSHE	ET		
Farm:		1653				Date:	A	pril 9, 200	8
Tract:		688							
				FIELD	FEATURE (1,2,4, or	VALUE F 8 points)			
		Field #:	4b	Acres:	23.4	Field #:	6a	Acres:	18.7
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Soil Group	1	4	4	4	4	4	4	4	4
2. Residual Soil Test (P)	3	1	3	1	3	1	3	1	3
3. Field Slope Percent	1	. 4	4	4	4	4	4	4	4
4. Land Cover Percent	3	4	12	1	3	4	12	1	3
5. Vegetative Buffer Width	3	8	24	8	24	8	24	8	24

Planned

Total

Existing

Total*

Planned

Total

Note: If existing total results in a "Low" or "Medium" rating, a nitrogen, or phosphorus based nutrient management plan may be implemented.

6. Ag. Impaired Watershed

7. Application Timing

8. Application Method

10. MLRA Location

TOTALS

9. Distance To Waterbody

FIELD FEATURES INDEX

Existing

Total*

Field Vulnerability for Phosphorus Loss							
Total Points from P Index	Generalized Interpretation of P Index						
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.						
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.						
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.						
> 112 ⁻	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.						

Spectrum Analytic Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

2351 US 51N BARDWELL, KY 42023 AGRI-CHEM Report To

Account - AGRI-CHEM STEVE CANNON Prepared For

Tested Sampled 04-10-2008 04-15-2008

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Ratings: L=Low M=Medium G=Good H=High V=Very High K: Approx. 5/29-F1 15/A = (M3-F * 0.1) * 2
K: Approx. 1N-NH4OAc 1b/A = (M3-K * 0.84) * 2

Mg: Approx. 1N-NH4OAc ib/A = (M3-Mg * 0.88) * 2 Ca: Approx. 1N-NH4OAc ib/A = (M3-Ca * 0.75) * 2

TRACT 688

84 163 1AC

FIRST C JAD-LOR 10 74 165 1AC

Analyzed by Spectrum Analytic Inc. www.spectrumanalytic.com

Soll An. s Report

Prepared For

Spectrum Analytic Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

2351 US 51N BARDWELL, KY 42023 AGRI-CHEM

> STEVE CANNON Account - AGRI-CHEM

> > Sampled Tested

09-28-2007 09-24-2007

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Results: P, K, Mg and Ca are extracted by Mehlich-3 (ICP) and are reported as follows: P: Approx. Bray-P1 lb/A = (M3-P * 0.7) * 2

Ratings: L=Low M=Medium G=Good H=High V=Very High

K: Approx. 1N-NH4OAc lb/A = (M3-K * 0.84) * 2

Ca: Approx. 1N-NH4OAc lb/A = (M3-Ca * 0.75) * 2

ST ISSING

1000

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Client: Carl Cannon

Farm/Tract: T-688

Prepared by: TOMMY L. REDDICK, SCT Date: 3:25-08

ANIMALS Habitat			*4,		Mgt.		Condition		PLANTS Suitability	Condition			AIR Quality										Quality			WATER Quantity	Deposition		-	Condition						SOIL FLOSION	*	
Don dation (Donalismo Dalamo		Food, Cover, Shelter & Quantity/Quality of Water	Pests	Nutrients	Establishment - Growth - Harvest	Health and Vigor		120	Adapted to site - soll/climate	Air Temperature, Movement, Humidity	Airborne Odors	Airborne Chemical Drift - on-site & off-site	Airborne Sediment and Smoke - on-site & off-site	Aqua	Tem	Low	Susp	Heart Paint	Nuc	Surface Water Contaminants Pest	Path	No.	Groundwater Contaminants Pesticides	Restriction from Sediment Deposition on-site & off-site (drainage ditches, road ditches, culverts, waterbodies, streams, lakes)	Inadequate Outlets	Excess - Flooding/Pending - Subsurface - Seeps		Contaminants: Excess Fertilizers - Pesticides - Chemicals Animal Waste or Other Organics	Compaction	_		Soil Mass Movement (hillsides, slippage or slope failures)	Stream Bank	Classic Gully (Channel needs to be stabilized)	Ephemeral Gully/Concentrated flow (usually eliminated by titlage)			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
ake	rates -	Indian										9	ff-site	Aquatic Habitat	Temperature	Law Dissolved Oxygen	Suspended Sediments	Pathogens	Nutrients & Organics	Pesticides	Pathogens Salts -	Nutrients & Organics	ticides	e & off-site (drainage streams, lakes)		eeps		es - Chemicals,		nic Matter	reas in Floodplains	slope failures)		ed)	y eliminated by titlage)			
,				2,3,4								2,3,4							2,3,4	2,3,4									2,3,4	2,3,4					2,3,4	23 4,	Fields	
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1 of 3

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

		The same of the sa		Ļ		
		(Y/N)	(Y/N)			
		Z	Z	Extensive:Capital required?		
		Z	Z	Extensive Labor required?		
	Economic	z	z	Very high Operation and Management Level required?	ed?	7000
		Z	z	High Economic risk involved?		
	Contat	Y	Υ .	Compatible with clients objectives, well being and safety?	afety?	
	ociai	Υ	~	Compatible with community well-being & environmental protection?	ental protection))
		Y	Υ	Environmental Justice Considered during planning	2	
		Spe	cial Environme	Special Environmental Concerns		
WILL	THE PRA	WILL THE PRACTICE/SYSTEM TO BE PLANNED:	O BE PLANNE	D: (Enter Field: Numbers for Yes Response)	(N/X)	FIELDS
1 Ne	gatively imp	act any prime or	unique farmlanc	Sce	z	
2. Inc	iude any ea	irth disturbing acti	vities near pipel	Include any earth disturbing activities near pipelines, electrical, or other utilities?	z	
3. Ha	we a high lil	celihood of causin	g a public contr	Have a high likelihood of causing a public controversy? (Animal Waste, Burning)	z	
4.	ffect any su lse (+) posit	Affect any suspected threatened or endangered species, Use (+) positive; (0) neutral/none, (-) adverse (circle one)	ed or endangere ne, (-) adverse (Affect any suspected threatened or endangered species, or their habitat? (Indian Bat) Use (+) positive; (0) neutral/none, (-) adverse (circle one)	(±	2,3,4
ת	anga hydro	ingy demosit fill c	r remove stilling	Change hydridany, denosit fill or remove stimps from wettends (M. FM. FMP) or DOs that	z	
	have been abandoned?	andoned?		o nom monanco (**; * **; * **;) or * oo man	-	
ğ	Yes, tandov	If Yes, tandowner advised of Food Secu	od Security Act	If Yes, tandowner advised of Food Security Act requirements and advised to contact COE & TOW concerning permit requirements?		İ
6	sult in the r	nodification of a st	ream channel, c	Result in the modification of a stream channel, or fill material being placed in any navigable	z	
æ	If Yes, owner advis	advised to contac	COE & DOW	If Yes, owner advised to contact COE & DOW for permit requirements?		
7	ontain any	practices consid	ered as PG or	Contain any practices considered as PG or G (CR Matrix, Sect I FOTG)?	Z	
7a	R review co	nducted by qualifi	ed individual res	CR review conducted by qualified individual results in "Undertaking Reviewed"	z	
β SQ	Review re	CR Review requires field invest (Further action is required)	igation by qualif	Two trains action is required. CR Review requires field investigation by qualified archaeologist/SHPO consultation? (Further action is required.)	N/A	
	cated adjad	ent to any federa pact federally des	lly designated w ignated wild or s	 Located adjacent to any federally designated wild or scenic river? Negatively impact federally designated wild or scenic river? (Permit may be required) 	Z	
· · · · E	cated adjac	ent to any state-c	lesignated spec	Located adjacent to any state-designated special use waters (Sect 1 FOTG)?	z	
- 1	egatively im Yes, lando	legatively impact riparian veget if Yes, landowner advised to co	station in areas r ontact COE & D	 Negatively impact riparian vegetation in areas regulated by Federal/state/local law? if Yes; landswine: advised to contact COE & DOW or other authority concerning MAPs or negative sequences? 	z	
1 7 7	esult in loss	 Result in loss of floodplain capacity? 	acity?		ž	
11a.O	wher advise	11a. Owner advised to contact DOW for permit requirements?	for permit requ	irements?	13 to	
The Informa	Information abov	e is based on/	a field review	Office Records;X_	Both (check one)	ت
		Utish	S	2-	25 6	Ð
Signature	NRCS		Title	le Date	6	

	may require preparation of an EA or EIS. The action will be referred to the State Office. Rationale supporting the finding
	X has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required.
13	is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.
100	is not a federal action. No additional analysis is required.
75.	Environmental Concerns, and the extraordinary circumstances criteria in the instructions for form NKCS-CFA-SZ 1 linkt, for the reasons stated below, that the selected alternative:

Conservation Plan Map

Customer(s): STEVE CANNON,

DISTRICE BARDWELL SOIL & WATER CONSERVATION DISTRICT

Approximate Acres: 120.1

Legal Description: FSN-1653, Tract-3644

Field Office: BARDWELL SERVICE CENTER
Agency: Natural Resources Conservation Service

Date: 4/16/2008

Assisted By: Tommy Reddick State and County: KY, HICKMAN



Legend

Consplan_T_3644

Filter strip

Waterway

-- Streams_ky039

1 inch equals 660 feet







SOIL MAP

Date: 3/24/2008

Customer(s): CARL E CANNON

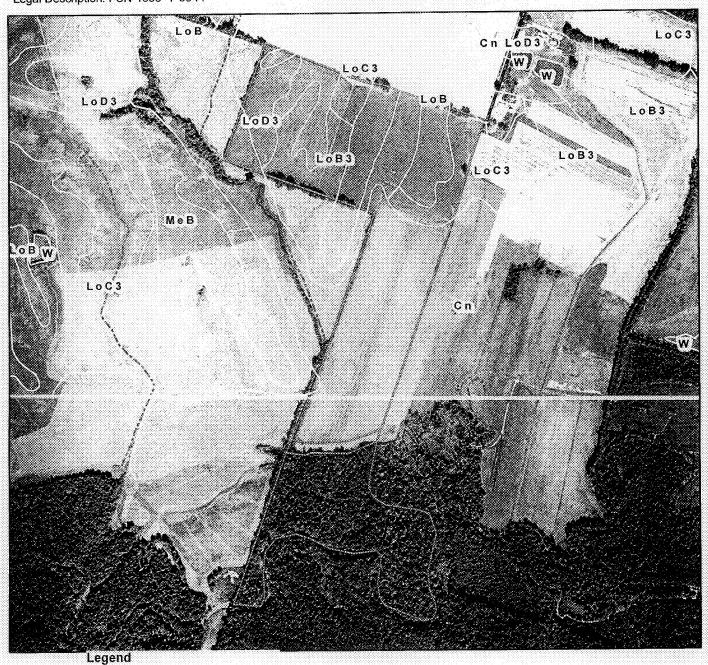
District: Carlisle County Approximate Acres: 0

Legal Description: FSN-1653 T-3644

Field Office: BARDWELL PROGRAM DELIVERY POINT

Agency: Natural Resources Conservation Service

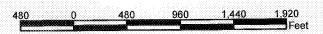
Assisted By: Tommy L Reddick State and County: KY, CARLISLE





Calisle County Soil Map

- Consplan_T_3644_CNMP_08
- **County Boundary**
- **Primary Roads**
- Local Roads
- Streams







Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoB3 - Loring silt loam, 2 to 6 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Workability is fair and yield potential is low.

Map Unit: LoC3 - Loring silt loam, 6 to 12 percent slopes, severely eroded

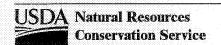
Description Category: SOI

Upland soil with a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Low yield potential. Best suited to pasture and hay.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a tragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007

Tract: 3644

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

See enclosed Revised Universal Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

		Planned		Applied	
	Field	Amount	Month Year	Amount	Date
ľ	1	52.4 ac	4 2010-2014		
ľ	2	33.8 ac	4 2010-2014		
ı	Total:	86.2 ac			

Nutrient Management: (590)

Crop nutrient needs will be obtained from application of Animal waste and commercial fertilizer according to comprehensive nutrient management plan.

	Planned		Applied	
Field	Amount	Month Year		Date
	52.4 ac	4 2011&2013		
2	33.8 ac	4 2011&2013		
Total:	86.2 ac			



Corn will be planted using residue and tillage management, mulch-till (345).

After swine waste has been injected, seedbed for corn will be prepared by lightly running a full width tillage implements such as phillips harrow or field cultivator. See the Revised Universal Soil Loss Equation (RUSLE2) erosion record(s) for the tillage operations necessary to obtain residue amounts needed to meet plan soil loss objectives.

	Planned		Applied	
Field	Amount	Month Year	Amount	Date
1	52.4 ac	4 2011&2013		
2	33.8 ac	4 2011&2013		
Total:	86.2 ac			

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	52.4 ac	10	2011-2014		
2	33,8 ac	10	2011-2014		
Total:	86.2 ac				

Tract: 3644

Filter Strip: (393)

Filter Strips (393) consisting of introduced grasses and legumes will be established for the primary purpose of protecting surface waters adjacent to cropland from Ag runoff of Sediments, Pesticides and Nutrients. Filter Strip will be established according NRCS Job Sheet CRP-JS-CP-21 and managed and maintained for duration of contract according to KY-NRCS-JS-CRP Management / Maintenance Job Sheet

Γ		Planned		Applied	
1	Field	Amount	Month Year	Amount	Date
Γ	2a	1.9 ac	9 1999	1.9 ac	10/1/1999
Γ	Total:	1.9 ac		1.9 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

ſ		Planned			Applied	
ı	Field	Amount	Month	Year	Amount	Date
I	2a	1.9 ac	9	1999	1.9 ac	10/1/1999
I	Total:	1.9 ac			1.9 ac	



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 3644

Field(s) No: 1

ſ	Location	Sail	Slope length	Avg. slope
1	Location	301	(horiz)	steepness, %
1	Kentucky\Carlisle	LoC3 Loring silt loam, 6 to 12 percent slopes, severely	150	80
L	County	eroded\Loring silt loam 85%	'''	<u> </u>

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7	Manure injector, liquid 30 inch rows	6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence		57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
·3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85
11/20	Harvest, killing crop 20pct standing stubble		95



(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating w/planned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

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	22.00						2000				 	-	1	1000	1.1	5,5,5,5					 								/ · · · ·		1.47				19.7	_		****		
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The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

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The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.



Bottomland –(Spring Inject LiquidManure + Disk) Followed by Conv Corn, Mulch Till Wheat (Disk2x, And broadcast wheat and No-till Double Crop beans. RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 3644

Field No 2

Inputs:

	Location		Soil			Slo	pe leng	gth	Avg. slop	е
1	Location	<u> </u>	3011				(horiz)		steepness,	%
K	(entucky\Carlisle	Cn Conven	nt-Adler silt loam	s, frequently			300		0.75	
	County	flooded	t\Convent silt loa	am 50%	1		300		0.70	

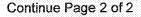
Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Corn, grain	bushels	140
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Wheat, winter, mid- south	Bushels	55
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Soybean, mw 15 - 20 in rows	_ bu	35

Contouring	Diversion/terrace, sediment	Subsurface	Adjust res.	General yield	Rock
Comoding	basin	drainage	burial level	level	cover, %
a. rows up-and-	(popo)	(nono)	Normal res.	NASS	
down hill	(none)	(none)	burial	INAGO	U

Outputs:

T Soil loss	Detachment on	Soil loss for	Sediment Net C	Net K	Crit. slope	Surf. cover after
value erod. portion	slope	cons. plan	delivery factor	factor	length	planting, %
50 11	1.1	11	11 0.075	0.47		

Aprox Date (+/- 2 weeks)	Operation	Description	Surf. res. cov. after op, %
4/26	Manure injector, liquid 30 inch	2522 gallons/ac	77
4/29	Disk, tandem secondary op.		39
4/30	Planter, double disk opnr	Corn, grain	39
5/15	Sprayer, Herbicide post emergence		34
9/20	Harvest, killing crop 20pct standing stubble		92
10/1	Disk, tandem light finishing		68
10/5	Disk, tandem light finishing		44
10/10	Planting, broadcast seeder	Wheat, winter, mid-south	43
3/15	Top Dress Wheat (Commercial Fertilizer)	See AGR-1	30
4/10	Sprayer, Herb post emergence		26
6/20	Harvest, killing crop 20pct standing stubble		92
6/23	Sprayer, kill crop		91
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	91
7/15	Sprayer, Herb post emergence		88
8/15	Sprayer, Herb post emergence		84
9/15	Sprayer, Herb post emergence		80
11/20	Harvest, killing crop 20pct standing stubble		94



FUEL USE EVALUATION:

I	Fuel type for entire	Equiv. diesel	use for entire	Energy use for	or entire	Fuel	cost for entire	e simulation,
1	run	simul	lation	simulati	on		US\$/ad	c
Ī	Diesel	9.	7	130000	00		32.9	

SCI and STIR Output

Soil conditioning index (SCI)	Avg. annual slope STIR	Wind & irrigation-induced e	erosion for SCI, t/ac/yr
0.53	41.4	0	

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

	KE	NTUCKY F	PHOSP	HORL	IS INDE	x wo	RKSHE	ЕТ		
Farm:			1653				Date:	P	pril 9, 200	8
Tract:			3644							
4460					FIELD		E VALUE For 8 points)			
			Field #:	1	Acres:	52.3	Field #:	2	Acres:	34.5
Field Fo	atures	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Se	oil Group	1	4	4	4	4	2	2	2.	2
2. Residual Soil	Test (P)	3	1	3	1	3	1	3	1	3
3. Field Slope P	ercent	200	4	4	4	4	1	1	1	1
4. Land Cover F	Percent	3	4	12	1	3	8	24	4	12
5. Vegetative Bu	uffer Width	3	8	24	8	24	8	24	1	3
6. Ag. Impaired	Watershed	1	1	1	1	1	1	1	1	1
7. Application T	iming	3	4	12	2	6	4	12	2	6
8. Application M	lethod	3	8	24	1	3	8	24	1	3
9. Distance To \	Waterbody	2	2	4	2	4	2	4	2	4
10. MLRA Locati	ion	and the second	2	2	2	2	2	2	2	2
FIELD FEATURI TOTALS	ES INDEX		Existing Total*	90	Planned Total	54	Existing Total*	97	Planned Total	37

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

Speatrum Analytia Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

AGRI-CHEM 2351 US 51N BARDWELL, KY 42023

Report To

Account - AGRI-CHEM STEVE CANNON Prepared For

Tested Sampled 09-28-2007 09-24-2007

				2 M				5.5		70	1833 M	132 L	104 L		O1			-	-B0.	8	
				2 <u>≤</u>			71.8	10.1		7.6			136 M	45 <u>×</u>	<u>_</u>			B01388 5	B0.	FETH BTTM-19	
nav alvosa				-			94.8			7.6	2880 V	53 L	136 M	78 G	ω 			B01387 6	ВО	FETH BTTM-18	SC F
				2						10	3180 H	169		67 M	2.7			B01386 6	80.	FETH BTTM-17	
		ety-Mexico		2 L			1 79.4	4.4		<u></u>	3522 H	116 L	<u> </u>	46 M	5	7.3		385	В0	ETH BTTM-16	SCF
		,			-					9.6	3456 V	81	3	45 M	ώ	_	<u></u>		80	FETH BTTM-15	
				<u></u>			92.6			7.1	2643 V	951	ष्ट	36 L	5			383	B01	FETH BTTM-14	
				2		**********			,	7.0	2634 V	67 L	<u> </u>	42 M	N			B01382 5	80	FETH BTTM-13	SCF
				_						8	3053 V	70 L	<u> </u>	70 M	4			B01381 6	80	ETH BTTM-12	SC F
		- Out-Owned		2			77.8			7.9		97 ل	<u> </u>	63 <u>M</u>	1.7	·	-	B01380 5	B0.	FETH BTTM-11	SCE
		- CET STATE OF		۲,	•		2 37.1		,	~~	1266 M	106 L		34 L	- <u>-</u>			B01379 4	80.	FETH BTTM-10	SC F
	in abino			2 M				N.3			2000 G	436 G	<u> </u>	32 L	1.2			B01378 6	801	FETH BTTM-9	SC F
				ω <u>≤</u>			32.7	11.7		15.5	2033 M	435 G	192 M	4.1 M	2.7	6.3	5.2	B01377 5	B0.	FETH BTTM-8	
				ა ≥							1992 M	273 M	<u> </u>	53 M	. &			B01376 5	B01	FETH BTTM-7	<i></i>
				ω ≤		********	53.2	11.8			2325 G	308 G	≥	62 M	<u>.</u>	·		B01375 5	B01	FETH BTTM-6	
	a schie					AKE 1894		9.6				215 M	<u> </u>	67 M	<u>.</u> 5		~~~	B01374 5	B01	FETH BTTM-5	SCF
				2 ⊠		<u></u>				8.6		146 M		70 M	1.7			B01373 5	B01	FETH BTTM-4	
								9.8		7.0	1991 G	165 M	141 M		<u>.</u>			B01372 5	B01	ETH BTTM-3	SCF
				2 3				13.6		8.0	2666 H	260 G	166 M	60 M	<u></u>			B01371 5	B01	ETH BTTM-2	SCF
				2 🛚					ა 5	9.4	1925 G	160 M	254 G	125 H	1.4	7		B01370 5	B01	ETH BTTM-1	SCF
Al	Mn	Cu	Fe	Zn 2.000	. 	Sullor	28	8	33	CEC	Calcium Ca	Mg	otassium M	isphorus P	atter Ph	Buffer M	S <i>oll</i>	Lab Number S	Lab N	Sample Number	2000 2000 2000 2000 2000 2000 2000 200

Resurts: P, K, mg and Ca are extracted by Memich-3 (iCP) and Ratings: L=Low M=Medium G=Good H=High V=Very High F(x) = (x) + (x)

Steep Cannon- Fetterson Bottom below Coulys Shap @ sud of Rd. C112 Surplus 14-20 Grid Sample - 1-13 THE RULL THE P AV 1 52.109

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Prepared by: TOMMY L: REDDICK, SCT Client: Carl Cannon Farm/Tract: T-3644

Date: 3-25-08

		ANIMALS							PLANTS				AIR													WATER										SOIL	Resource
	Mat	Habitat			Mgt.		Condition		Suitability	Condition			Quality										Quality			Quantity	Deposition			Condition	!					Erosion	Concern
Animal Health - Poisonous plants, disease, parasites, insects	Population/Resource Balance	Food, Cover, Shelter & Quantity/Quality of Water	Pests	Nutrients	Establishment - Growth Harvest	Health and Vigor	Productivity - Kinds, Amounts, Distribution	Intended Use	Adapted to site - soll/climate	Air Temperature, Movement, Humidity	Airborne Odors	Airborne Chemical Drift - on-site & off-site	Airborne Sediment and Smoke - on-site & off-site	Aquatic Habitat	Temperature	Low Dissolved Oxygen	Suspended Sediments	Heavy Metals - Salts - Pathogens	Nutrients & Organics	Surface Water Contaminants Pesticides	Heavy Metals - Salts Pathogens	Nutrients & Organics	Groundwater Contaminants Pesticides	Restriction from Sediment Deposition on-site & off-site (drainage ditches, road ditches, culverts, waterbodies, streams, lakes)	Inadequate Outlets	Excess - Flooding/Ponding - Subsurface - Seeps		Contaminants: Excess Fertilizers - Pesticides Chemicals, Animal Waste or Other Organics	Compaction	Tith - Crusting - Water Infiltration - Organic Matter	Road Banks, Construction Sites, Scoured Areas in Floodplains	Soil Mass Movement (hillsides, slippage or slope failures)	Stream Bank	Classic Gully (Channel needs to be stabilized)	Ephemeral Gully/Concentrated flow (usually eliminated by tillage)	Sheet & Rill	Consideration
insects														tat		эд Охудеп	Sediments	S - Calts -			s - Salts -	Organics		:e (drainage · lakes)				micals,			oodplains	ırės)					+
				1,2								1,2							1,2	1,2									1,2	1,2					1,2	1,2	Feids

1 of 3

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

10a.	10.	1	ဖ			L EN		7a.	7.		j.	П		ĺΩ	RN	4.	ω	2.		IIM			••••	••••	•••		•••			HUMAN
BMPs or permit requirements?	If Yes, landowner advised to c	Vegatively impact riparian veg	Located adjacent to any state-designated special use waters (Sect 1 FOTG)	Negatively impact tederally dea	Located adjacent to any federally designated wild or scenic river?	CR Review requires field investi Further action is required)	(No further action is required)	CR review conducted by qualif	Contain any practices considered as PG or G (CR Matrix, Sect FOTG)?	6a. If Yes, owner advised to contact COE & DOW for permit requirements?	Result in the modification of a s water or tributary?	DOW concerning permit requirements?	have been abandoned?	hange hydrology, deposit fill,	(If adverse effect is indicated, USFWS consultation Required)	Affect any suspected threaten	lave a high likelihood of causir	nclude any earth disturbing act	legatively impact any prime or	WILL THE PRACTICE/SYSTEM TO BE PLANNED:	Spe	Υ	Y	Y	Z	Economic N	Z	Z	(N/X)	INSTALLED
?	ontact COE & D	etation in areas r	designated speci	signated wild or s	illy designated w	tigation by qualif	. •	ied individual res	ered as PG or o	COE & DOW f	tream channel, c	ements?	and Spourity Act	or remove stump	d, USFWS cons	ed or endangere	ig a public contro	ivities near pipel	unique farmland	TO BE PLANNE	cial Environme	Υ	~	~	z	z	z	z	(Y/N)	DURING LIFESPAN
	If Yes, landowner advised to contact COE & DOW or other authority concerning BMPs or normit reguliforments?	Negatively impact riparian vegetation in areas regulated by Federal/state/local law?	al use waters (Sect 1 FOTG)?	8a. Negatively impact rederally designated wild or scenic river? (Fermit may be required)	ild or scenic river?	CR Review requires field investigation by qualified archaeologist/SHPO consultation? (Further action is required)		CR review conducted by qualified individual results in "Undertaking Reviewed"	G (CR Matrix, Sect I FOTG)?	or permit requirements?	Result in the modification of a stream channel, or fill material being placed in any navigable water or tributary?	DOW concerning permit requirements?	requirements and advised to centact COE &	Change hydrology, deposit fill, or remove stumps from wettands (W, FW, FWP) or PCs that	ultation Required)	Affect any suspected threatened or endangered species, or their habitat? (Indian Bat)	Have a high likelihood of causing a public controversy? (Animal Waste, Burning)	Include any earth disturbing activities near pipelines, electrical, or other utilities?	 Negatively impact any prime or unique farmland or scenic beauty of the area? 	D: (Enter Field Numbers for Yes Response)	Special Environmental Concerns	Environmental Justice Considered during planning?	Compatible with community well-being & environmental protection?	Compatible with clients objectives, well being and safety	High Economic risk involved?	Very high Operation and Management Level required?	Extensive Labor required?	Extensive Capital required?		CONSIDERATION
		z	Z		Ν	N/A	:	Z	z		z			z		ŧ	z	z	z	(N/Y)		2	ental protex	safety?		ed?				
									STREET, STREET					500		1,2				FIELDS			ction?							

The Market of th	N 97	3-25-8
Signature NRCS	Title	Date
Findings. I have considered the effects of this action and the atternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary circumstances criteria in the instructions for form NRCS-CPA-S2. I find, for the reasons stated below, that the selected atternative:	we considered the effects of this action and the alternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary circumstances criteria in the Instructions for form NRCS-CPA-52. I find, for the reasons stated below, that the selected alternative:	, and Social Considerations; the Special s for form NRCS-CPA-52. I find, for the
is not a federal action. No additional analysis is required.	sis is required.	
is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.	onmental analysis and there are no extraordin	
X has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required		ary circumstances. No additional analysi
may require preparation of an EA or EIS. The action will be referred to the State Office.) NRCS environmental document. No addition	ary circumstances. No additional analysi al analysis is required.
Rationale supporting the finding) NRCS environmental document. No addition eaction will be referred to the State Office.	iary circumstances. No additional analysi ial analysis is required.

Location Map

Agency: USDA

Bardwell NRCS Office State: Kentucky

Owner/Operator: STEVE CANNON

Conservation District: Carlisle County

Assisted By: Todd Templeton

Date: 11/19/2007 CARLISLE CO. Farm Service Agency TRACTS 414, 659, 687, 690, 4016 & 4017



CNMP Land Application Year 2 & 4

- Tract Boundaries
- US HWY
- EXPRESSWAY
- MAJOR ROAD
- Swine Feed Facility

1 inch equals 2,000 feet



1,100 0 1,100 2,200 3,300 4,400 Feet



CONSERVATION PLAN MAP

Date: 3/27/2008

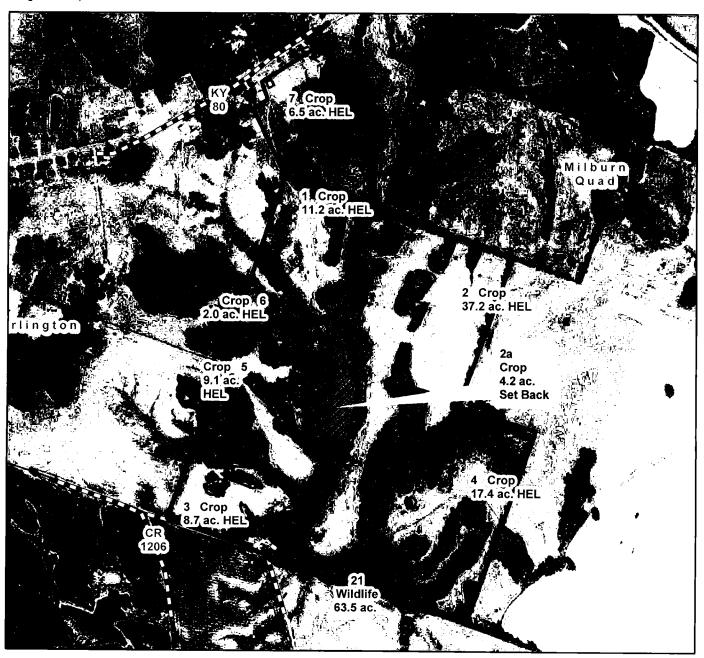
Customer(s): STEVE CANNON, DISTRICT Callise County

Approximate Acres: 0

Legal Description: FSN-282 T-414

Field Office: BARDWELL PROGRAM DELIVERY POINT Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE





Consplan_T_414_CNMP_08

Setback

Tract Boundaries

Highway/Roads

quads24k_a_ky039







SOIL MAP

Date: 3/27/2008

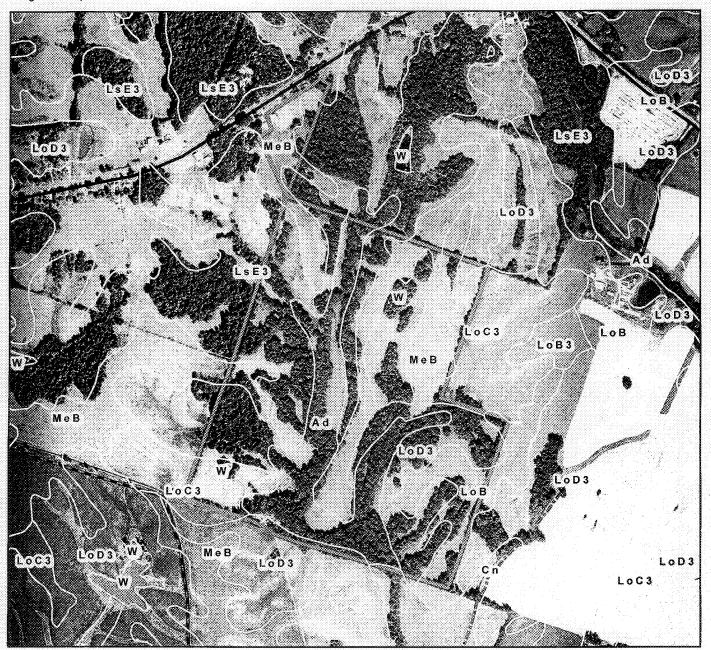
Customer(s): HARDY L FERGUSON

District: Carlisle County
Approximate Acres: 0

Legal Description: FSN-282 T-414

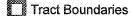
Field Office: BARDWELL PROGRAM DELIVERY POINT Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE



Legend

Calisle County Soil Map



County Boundary

- Primary Roads

- Local Roads

Streams





Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Ad - Adler silt loam, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soil that is subject to flooding in winter and spring. Seasonal water table at about 2 feet.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoB3 - Loring silt loam, 2 to 6 percent slopes, severely eroded

Description Category: SOI

Upland soll that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Workability is fair and yield potential is low.

Map Unit: LoC3 - Loring silt loam, 6 to 12 percent slopes, severely eroded

Description Category: SOI

Upland soil with a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Low yield potential. Best suited to pasture and hay.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: LsE3 - Loring-Memphis-Saffell complex, 12 to 30 percent slopes, severely eroded

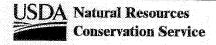
Description Category: SOI

Moderately deep and deep soils on uplands. Fragipan in Loring soils at a depth of about 1 foot slows water movement and restricts roots. Saffell soils are underlain with very gravelly material. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: MeB - Memphis silt loam, 2 to 6 percent slopes

Description Category: SOI

Silty, upland soil on broad ridges. Root zone is deep and available water capacity is high. Very erodible due to high silt content. Tilth and yield potential are good.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007



Natural Resources Service

BARDWELL PROGRAM DELIVERY POINT 140 STATE ROUTE 123 Conservation BARDWELL, KY 42023-8734

(270) 628-5453

MARK CLAXTON DISTRICT CONSERVATIONIST

Conservation Plan

STEVE CANNON **331 COUNTY ROAD 1232** ARLINGTON, KY 42021

CNMP Land Application Year 2 & 4

Tract: 414

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

See enclosed Revised Univeral Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	11.2 ac	4	2011-2014		
2	37.2 ac	4	2011-2014		
3	8.7 ac	4	2011-2014		
4	17.4 ac	4	2011-2014		
5	9.1 ac	4	2011-2014		
6	2 ac	4	2011-2014		
7	6.5 ac	4	2011-2014		
Total:	92.1 ac				

Nutrient Management:(590)

Crop nutrient needs will be obtained from the application of Animal waste and commercial fertilizer according to an approved Comprehensive Nutrient Management Plan.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	11.2 ac	4	2012&2014		
2	37.2 ac	4	2012&2014		
3	8.7 ac	4	2012&2014		
4	17.4 ac	4	2012&2014		
5	9.1 ac	4	2012&2014		
6	2 ac	4	2012&2014		
7	6.5 ac	4	2012&2014		
Total:	92.1 ac				



Corn will be planted using residue and tillage management, mulch-till (345).

Crop residues will be uniformly spread on soil surface after harvest. The soil will be tilled prior to planting using full width tillage implements such as chisels, rippers, light disking, field cultivators and/or phillips harrows. Weed control will be accomplished by a combination of tillage and herbicide applications. See the enclosed Revised Universal Soil Loss Equation (RUSLE2) record(s)for the tillage operations and residue amounts necessary to meet the planned soil loss objectives.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	11.2 ac	2	1 2012&2014		
2	37.2 ac	- 4	1 2012&2014		
3	8.7 ac	2	2012&2014		
4	17.4 ac	4	2012&2014		
5	9.1 ac	4	2012&2014		
6	2 ac	4	2012&2014		
7	6.5 ac		2012&2014		
Total:	92.1 ac				

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	11.2 ac	10	2012&2014		
2	37.2 ac	10	2012&2014		
3	8.7 ac	10	2012&2014		
4	17.4 ac	10	2012&2014		
5	9.1 ac	10	2012&2014		
6	2 ac	10	2012&2014		
7	6.5 ac	10	2012&2014		
Total:	92.1 ac				



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 414

Field(s) No: 1,2,3,4,5,6,7

200				
			Slope lenath	
				Avg. slope 1
	Location			
200		kananan da bana bana da da da banan da banan da banan da banan da banan da banan da banan da banan da banan da	I I I I I I I I I I I I I I I I I I I	Organiana U/ I
			l (horiz)	steepness. %
				0.0000000, 70
200	1/	LoC3 Loring silt loam, 6 to 12 percent slopes, severely		
	Kentuckv\Carlisle	I Of "2 Loring with Loring Orlando		
	INCHILLIAN VILLAGIJISTE	I TOURS FOR INTERPRETARIOUS PROPERTY OF THE PR		
		Loop round out locally of to 12 Delegal Saures Severely		
			470	8 8
			1 150	
		eroded\Loring silt loam 85%		
		erede intering out today 0000		
		212 22 312 3111 g 3111 12 4111 12 670		

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7	Manure injector, liquid 30 inch rows	6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence	7.9	57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85
11/20	Harvest, killing crop 20pct standing stubble		95



(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating Wolanned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

Fuel type for entire run					
				ion. US\$/a	
Diesel					
			33.20		

Soil conditioning index (SCI) +0.26

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg. annual slope STIR 20.0

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

K	ENTUCKY I	PHOSE	'HORI	US INDE	EX WC	RKSHE	ЕТ	100	
Farm:		282				Date:	:	April 8, 200	18
Tract:		414		Part of the same o					
Comment Comments				FIELD		E VALUE F or 8 points)		5	
		Field #:	: 1	Acres:	11.2	Field #:	2	Acres:	37.2
Field Features	Weighted Factor (WF)	Existing Value	-WF x Existing Value	g Flanned: Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Soil Group	1	4	4	4	4	4	4	4	4
2. Residual Soil Test (P)	-3	1	3	1	3	1	3	1	3
Field Slope Percent	1	4	4	4	4	4	4	4	4
Land Cover Percent	3	4	12	1	3	4	12	1	3
5. Vegetative Buffer Width	2 2000	8	24	8	24	8	24	8	24
6. Ag. Impaired Watershed	1	1	1	1	1	1	1	1	1
7. Application Timing	3	4	12	2	6	4	12	2	6
8. Application Method	3	8	24	1	3	8	24	1	3
9. Distance To Waterbody	2	2	4	2	4	2	4	2	4
10. MLRA Location	a 1 =	2	2	2	2	2	2	2	2
FIELD FEATURES INDEX FOTALS		Existing Total*	90	Planned Total	54	Existing Total*	90	Planned Total	54

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

KE	NTUCKY F	PHOSP	HORI	JS INDE	X WC	RKSHE	ET		
Farm:		282	<u> </u>			Date:		April 8, 200	8
Tract		414							
				FIELD		RE VALUE F or 8 points)		S	
		Field #:	3	Acres:	8.7	Field #:	4	Acres:	17.4
Field Features	Weighted Factor (WF)	Existing Value	WF.x Existing Value	o in Lennen	: WF x Planne Value		WF x Existing Válue	Planned Value	WF x Planned Value
Hydrologic Soil Group	1	4	4	4	4	4	4	4	4
Residual Soil Test (P)	3	1	3	1	3	1	3	1	3
3. Field Slope Percent	1	4	4	4	4	4	4	4	4
4. Land Cover Percent	3.4	4	12	1	3	4	12	1	3
5. Vegetative Buffer Width	3	8	24	8	24	8	24	8	24
6. Ag. Impaired Watershed	1	1	1	1	1	1	1	1	1
7. Application Timing	3	4	12	2	6	4	12	2	6
8. Application Method	. 3	8	24	1	3	8	24	1	3
9. Distance To Waterbody	2 =	1	2	1 1	2	1 1	2	1 1	2
10. MLRA Location	-1	2	2	2	2	2	2	2	2
FIELD FEATURES INDEX FOTALS		Existing Total*	88	Planned Total	52	Existing Total*	88	Planned Total	52

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

	KE	NTUCKY F	HOSP	HORI	JS INDE	X WC	RKSHE	ET		
Farm:			282				Date:		April 8, 200	18
Tract:			414							
					FIELD		RE VALUE R or 8 points)		3	
			Field #:	5	Acres:	9.1	Field #:	6	Acres:	2
Field Featu	ires	Weighted Factor (WF)	Existing Value	WF x Existing Value	Flamed Velue	WF x Planned Value		WF x Existing Value	Hanned 9 Value	WF x Planned Value
1. Hydrologic Soil G	3roup	1	4	4	4	4	4	4	4	4
2. Residual Soil Te	st (P)	3	1	3	1	3	1 1	3	1	3
Field Slope Perc	ent	1	4	4	4	4	4	4	4	4
4. Land Cover Perc	ent	3	4	12	1	3	4	12	1	3
Vegetative Buffer	r Width	3	8	24	8	24	8	24	8	24
6. Ag. Impaired Wa	itershed	1.00	1	1	1	1	1	1	1	1
7. Application Timin	ıg	3 3 3 3	4	12	2	6	4	12	2	6
8. Application Metho	od	3	8	24	1	3	8	24	1	3
9. Distance To Wate	erbody	2	1	2	1	2	1	2	1	2
10. MLRA Location		1	2	2	2	2	2	2	2	2
FIELD FEATURES I TOTALS	NDEX		Existing Total*	88	Planned Total	52	Existing Total*	88	Planned Total	52

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

	KENTUCKY F	PHOSE	'HORI	US INDE	EX WC)RKSHE	ЕТ		
Farm:		282				Date:	:	April 8, 200	8
Tract:		414							
			FIELD	RE VALUE F or 8 points)		is			
		Field #:	:7_	Acres:	6.5	Field #:		Acres:	
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	g Planned	WF x Planne Value	d Existing	WF x Existin Value	g Planned	WF x Planned Value
Hydrologic Soil Group	1	4	4	4	4				
2. Residual Soil Test (P)	Alice 3	1	3	1	3				
3. Field Slope Percent	<u>. 1</u>	4	4	4	4				
4. Land Cover Percent	3	4	12	1	3				
5. Vegetative Buffer Widt	th 3	8	24	8	24				
6. Ag. Impaired Watershe	ed 1	1	1	1	1				
7. Application Timing	3	4	12	2	6				
8. Application Method	3	8	24	1 1	3			1	
9. Distance To Waterbod	y 2	1	2	1	2				
10. MLRA Location	1	2	2	2	2			1	
FIELD FEATURES INDEX FOTALS		Existing Total*	88	Planned Total	52	Existing Total*	0	Planned Total	0

	Field Vulnerability for Phosphorus Loss
Total Points from P	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

www.spectrumanalytic.com

AGRI-CHEM 2351 US 51N BARDWELL, KY 42023

Accc STE

Proparad Egr.
Account - AGRI-CHEM
STEVE CANNON

Sampled 09-24-2007 Tested 09-28-2007

Ratings: L=Low M=Medium G=Good H=High V=Very High

Mg: Approx. 1N-NH4OAc lb/A = (M3-H * 0.7) * 2

K: Approx. 1N-NH4OAc lb/A = (M3-K * 0.84) * 2

Ca: Approx. 1N-NH4OAc lb/A = (M3-Ca * 0.75) * 2

5-tare Cannon - Fetherm Hills on Cerl Common TRACT HIM TICA 1,6 56.0 185/AC 30 ths 1 A Co 35. X 18 / 10 PRIS BALA

Analyzed by Spectrum Analytic Inc. www.spectrumanalytic.com

Line 1 = 1/20 12/00

HID:9743-0651-1950-0008

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Client: Hardy Ferguson Farm/Tract: T-414

Prepared by: TOMMY L. REDDICK, SCT

Date: 3-27-08

	Animal Health - Poisonous plants, disease, parasites, insects	1	
	Ponulation/Resource Relance		
	Food, Cover, Shelter & Quantity/Quality of Water	Habitat	ANIMALS
	Pests		
all	Nutrients		
	Establishment - Growth - Harvest	Mgt.	
	Health and Vigor		
	Productivity - Kinds, Amounts, Distribution	Condition	
	Intended Use	1	
	Adapted to site - soll/dimate	Suitability	PLANTS
	Air Temperature, Movement, Humidity	Condition	
	Airborne Odors		
all	Airborne Chemical Drift - on-site & off-site		
	Airborne Sediment and Smoke - on-site & off-site	Quality /	AIR
	Aquatic Habitat		
	Temperature		
	Low Dissolved Oxygen		
	Suspended Sediments		
	Pathogens - Salts -	,	
all	Nutrients & Organics		
all	Surface Water Contaminants Pesticides		
	Heavy Metals - Salts - Pathogens		
	Nutrients & Organics		
	Groundwater Contaminants Pesticides	Quality	
	eposition or		
	Inadequate Outlets		
	Excess - Flooding/Ponding - Subsurface - Seeps	Quantity	WATER
	Damage and Safety - on-site & off-site	Deposition	
	Contaminants: Excess Fertilizers - Pesticides - Chemicals, Animal Waste or Other Organics	_	
all	Compaction		
ali	Tith - Crusting - Water Infiltration - Organic Matter	Condition	
	Road Banks, Construction Sites, Scoured Areas in Floodplains		
in the second se	Soil Mass Movement (hillsides, slippage or slope failures)		
	Stream Bank	401	
	Classic Gully (Channel needs to be stabilized)		
all	Ephemeral Gully/Concentrated flow (usually eliminated by tillage)		
<u>al</u>	Sheet & Rill	Erosion	SOIL
Figida	Consideration	College	Cologn
	THE RESERVE THE PROPERTY OF TH	THE PERSON NAMED IN COLUMN TWO	PANN DESCRIPTION OF PROPERTY.

1 of 3

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

HUMAN NSTALLED LFESPAN (Y/N)	INSTALLED LIFESPAN (YIN) (YIN) (YIN) RECONOMIC NO. 1015 PRACTICE/SYSTEM TO BE PLANINED RECONOMIC NO. 1015 PRACTICE/SYSTEM TO BE PLANINED RECONOMIC NO. 1015 PRACTICE/SYSTEM TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED REGISTRY SUPPORT DISTURBING TO BE PLANINED RESULT IN THE MODIFICATION OF SUPPORT DISTURBED REGISTRY SUPPORT DISTURBING TO SUPPORT DISTURBED REGISTRY SUPPORT DISTURBING TO SUPPORT DISTURBED REGISTRY SUPPORT DISTURBING TO SUPPORT DISTURBED REGISTRY
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Findings. I have considered the effective considered the effective concerns and the effective control of the effective control of the effective control of the effective control of the effective control of the effective control of the effective control of the effective control of the effective control of the effective consideration of the effective consideration of the effective consideration of the effective consideration of the effective control of the effective con	Signature NRCS
Findings. I have considered the effects of this action and the alternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary circumstances criteria in the instructions for form NRCS-CPA-52. I find, for the reasons stated below, that the selected alternative:	Title
conomic, and Social Considerations; the Special structions for form NRCS-CPA-52. I find, for the	Date

Is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.

X has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required.

_ is not a federal action. No additional analysis is required.

may require preparation of an EA or EIS. The action will be referred to the State Office.

Rationale supporting the finding

CONSERVATION PLAN MAP

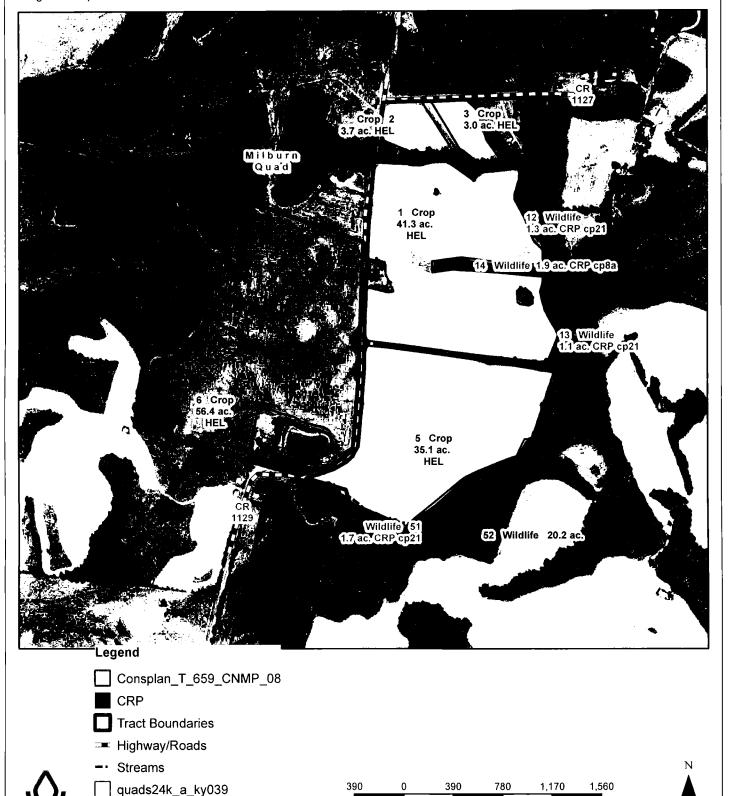
Date: 3/31/2008

Customer(s): AUBERT PEARSON, STEVE CANNON District: Carlisle County

Approximate Acres: 165.7

Legal Description: FSN-536 T-659

Field Office: BARDWELL PROGRAM DELIVERY POINT
Agency: Natural Resources Conservation Service
Assisted By: Tommy L Reddick
State and County: KY, CARLISLE



SOIL MAP

Date: 3/31/2008

Customer(s): AUBERT PEARSON

District: Carlisle County Approximate Acres: 0

Legal Description: FSN-536 T-659

Field Office: BARDWELL PROGRAM DELIVERY POINT

Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE



Legend

Calisle County Soil Map

- Tract Boundaries
- Streams
- ___ quads24k_a_ky039





Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Ad - Adler silt loam, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soil that is subject to flooding in winter and spring. Seasonal water table at about 2 feet.

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoC3 - Loring silt loam, 6 to 12 percent slopes, severely eroded

Description Category: SOI

Upland soil with a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Low yield potential. Best suited to pasture and hay.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

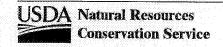
Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: LsE3 - Loring-Memphis-Saffell complex, 12 to 30 percent slopes, severely eroded

Description Category: SOI

Moderately deep and deep soils on uplands. Fragipan in Loring soils at a depth of about 1 foot slows water movement and restricts roots. Saffell soils are underlain with very gravelly material. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007

Tract: 659

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

See enclosed Revised Univeral Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	41.3 ac	4	2011-2014		
2	3.7 ac	4	2011-2014		
3	3 ac	4	2011-2014		
5	35.1 ac	4	2011-2014		
Total:	83.1 ac				

Nutrient Management: (590)

Crop nutrient needs will be obtained from the application of Animal waste and commercial fertilizer according to an approved Comprehensive Nutrient Management Plan.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	41.3 ac	4	2012&2014		
2	3.7 ac	4	2012&2014		
3	3 ac	4	2012&2014		
5	35.1 ac	4	2012&2014		
Total:	83.1 ac				

Residue and Tillage Management, Mulch Till: (345)

Following nutrient injection, Corn will be planted using residue and tillage management, mulch-till (345). Crop residues will be uniformly spread on soil surface after harvest. The soil will be tilled prior to planting using full width tillage implements such as chisels, rippers, light disking, field cultivators and/or phillips harrows. Weed control will be accomplished by a combination of tillage and herbicide applications. See the enclosed Revised Universal Soil Loss Equation (RUSLE2) record(s)for the tillage operations and residue amounts necessary to meet the planned soil loss objectives.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	41.3 ac		2012&2014	Aunounc	
2	3.7 ac	4	2012&2014		
3	3 ac	4	2012&2014		
5	35.1 ac	4	2012&2014		
Total:	83.1 ac				

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	41.3 ac	10	2012&2014		
2	3.7 ac	10	2012&2014		
3	3 ac	10	2012&2014		
5	35.1 ac	10	2012&2014		
Total:	83.1 ac				



Tract: 659

Filter Strip: (393)

Filter Strips (393) consisting of introduced grasses and legumes will be established for the primary purpose of protecting surface waters adjacent to cropland from Ag runoff of Sediments, Pesticides and Nutrients. Filter Strip will be established according NRCS Job Sheet CRP-JS-CP-21 and managed and maintained for duration of contract according to KY-NRCS-JS-CRP Management / Maintenance Job Sheet.

Field	Planned Amount	Month	Year	Applied Amount	Date
12	1.3 ac	4	2000	1.3 ac	10/19/2001
13	1.1 ac	4	2000	1.1 ac	10/19/2001
52	1.7 ac	4	2000	1.7 ac	10/19/2001
Total:	4.1 ac			4.1 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

Field	Planned Amount	Month Y	ear	Applied Amount	Date
12	1,3 ac	4	2000	1.3 ac	10/19/2001
13	1.1 ac	4	2000	1.1 ac	10/19/2001
52	1.7 ac	4	2000	1.7 ac	10/19/2001
Total:	4.1 ac			4.1 ac	



Tract: 659

Grade Stabilization Structure: (410)

A Grade Stabilization Stucture (410) will be installed according to NRCS Standards and specifications and maintained for the duration of the CRP contract.

	Planned		Applied	
Field	Amount	Month Year	Amount	Date
11	1 no	9 2000	1 no	10/19/2001
14	1 no	9 2000	1 no	10/19/2001
Total:	2 no		2 no	

Grassed Waterway: (412)

A grassed waterway (cp8a) will be constructed according to NRCS engineering design and maintained for the duration of the CRP contract according to KY-NRCS-JS-CRP Management /Maintenance Job Sheet.

ſ		Planned		Applied	
L	Field	Amount	Month Year	Amount	Date
	11	0.6 ac	9 2000	0.6 ac	10/19/2001
	14	1.9 ac	9 2000	1.9 ac	10/19/2001
T	Total:	2.5 ac		2.5 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

	Planned		Applied	······································
Field	Amount	Month Year	Amount	Date
11	0.6 ac	9 2000	0.6 ac	10/19/2001
14	1.9 ac	9 2000	1.9 ac	10/19/2001
Total:	2.5 ac		2.5 ac	



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 659

Field(s) No: 1, 2, 3, 5, 6

		Slone length	Avg. slope
Location	1 Soil	Clope longer	7 trg. diope
		(horiz)	steepness. %
Kentucky\Carliele	LoC3 Loring silt loom 6 to 13 agreemt along	† '	
Rentucky (Carriste	LoC3 Loring silt loam, 6 to 12 percent slopes, severely	450	
County	eroded\Loring sitt toam 85%	150	8.0
County	eroded/Lorning Silt loat it 65%		

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7	Manure injector, liquid 30 inch rows	6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence	i i	57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85 .
11/20	Harvest, killing crop 20pct standing stubble		95



(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating Wplanned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

 Fuel type for entire run	 Fuel cost for entire simulation, US\$/ac
Diesel	
	\$33.20/ac

Soil conditioning index (SCI) +0.26

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg. annual slope STIR 20.0

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

KE	ENTUCKY F	PHOSP	HORU	JS INDE	EX WO	RKSHE	ΕT		W 12
Farm:		536				Date:	,	April 9, 200	18
Tract:		659							
			FIELD FEATURE (1,2,4, or					}	
	9985	Field #:	. 1	Acres:	41.3	Field #:	2	Acres:	3.7
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planted Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Soil Group		4	4	4	4	4	4	4	4
2. Residual Soil Test (P)	3.3	1	3	1	3	1	3	1	3
Field Slope Percent	1	4	4	4	4	4	4	4	4
4. Land Cover Percent	3	4	12	1	3	4	12	1	3
5. Vegetative Buffer Width	3	8	24	1 1	3	8	24	8	24
6. Ag. Impaired Watershed	1.00	1	1	1	1	1	1	1	1
7. Application Timing	3	4	12	2	6	4	12	2	6
8. Application Method	-3	8	24	1	3	8	24	1	3
9. Distance To Waterbody	2	8	16	8	16	2	4	2	4
10. MLRA Location	1	2	2	2	2	2	2	2	2
FIELD FEATURES INDEX TOTALS	2000 2000 2000 2000 2000 2000 2000 200	Existing Total*	102	Planned Total	45	Existing Total*	90	Planned Total	54

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting t waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

KE	NTUCKY P	PHOSE	'HORI	JS INDE	X WC	RKSHE	ΕT			
Farm:		536				Date:		April 9, 200	8	
Tract:		659								
	10 mg			FIELD		E VALUE F or 8 points)	VALUE RATINGS or 8 points)			
		Field #	:3	Acres:	3	Field #:	5	Acres:	35.1	
Field Features	Weighted Factor (WF)	Existing Value	WFX Existing Value	I Flammed Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	
Hydrologic Soil Group		4	4	4	4	4	4	4	4	
Residual Soil Test (P)	3	1	3	1	3	1	3	1	3	
Field Slope Percent	and the same	4	4	4	4	4	4	4	4	
4. Land Cover Percent	3	4	12	1	3	4	12	1	3	
5. Vegetative Buffer Width	3	8	24	8	24	8	24	1	3	
6. Ag. Impaired Watershed	- 1	1	1	1	1	1	1	1	1	
7. Application Timing	3	4	12	2	6	4	12	2	6	
8. Application Method	3	8	24	1	3	8	24	1	3	
9. Distance To Waterbody	2	2	4	2	4	8	16	8	16	
10. MLRA Location	1	2	2	2	2	2	2	2	2	
FIELD FEATURES INDEX TOTALS		Existing Total*	90	Planned Total	54	Existing Total*	102	Planned Total	45	

	Field Vulnerability for Phosphorus Loss
Total Points from P	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

	KENTUCKYI	PHOSE	'HORI	US INDE	EX WC	RKSHE	ΕT			
Farm:		536				Date:		April 9, 200)8	
Tract:		659								
			FIELD FEATURE VALUE RATINGS (1,2,4, or 8 points)							
50000 20000		Field#	: 6	Acres:	56.4	Field #:	-	Acres		
Field Features	Weighted Factor (WF)	Existing Value	WF x Existin Value	Hanned	WF x Planne Value	d Existing	WF x Existin Value	g Planned 9 Value	WF.x Planne Value	
Hydrologic Soil Group	1	4	4	4	4					
Residual Soil Test (P)	1000 Carlos (1000	1	3	1	3					
3. Field Slope Percent	24 THE BEST	4	4	4	4					
4. Land Cover Percent	3 3	4	12	1	3					
5. Vegetative Buffer Width	3	8	24	8	24					
3. Ag. Impaired Watershed	1	1	1	1	1					
7. Application Timing	3	4	12	2	6					
3. Application Method	3	8	24	1	3		-			
9. Distance To Waterbody	2	1	2		2					
10. MLRA Location	ing Late	2	2	2	2					
FIELD FEATURES INDEX FOTALS		Existing Total*	88	Planned Total	52	Existing Total*	0	Planned Total	0	

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

Soll Ani s Report

Prepared For

Spectrum Analytic Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

BARDWELL, KY 42023 2351 US 51N AGRI-CHEM Report To

Account - AGRI-CHEM
STEVE CANNON

Sampled Tested

04-15-2008 04-10-2008

The state of the s			2000		Ang.	F22197	BEHIND HAROLD	WANDA BACK 40	RSON SAWMILL &	BEARSON BIG FLD	TOB BARN WIV	WANDA HILL Mario	WANDA BTTM SOLS	FRNT CARLYS 3	BHU CARLY SHO	Sample Number
1	77	ry		•	Past Tok	F22197	F22196		F22194	F22193	F22192	F22191	F22190	F22189	F22188	7
	3		<u>.</u>			<i>i</i>	6 6	5.8	6.5 5	5.9	5.6	5.8	6.7	6.1	6.0	Solf
						6.9	7.0	6.6	7.1	6.6	6.6	<u>ග</u>	7.1	6.9	68	Buffer
	F4X malakanga	· · ·				<u>ි</u>	2.1	2.0	1.8	<u>-1</u>	2.0	1.7	<u>.</u> 6	1 .6	1.7	Matter 1
			·		:	59 M	69 G	49 M	^38 M	43 M	29 L	22 L	42 M	28 ⁻ L	74 G	hösphorus P
							237 M	254 M	38 M >249 M	43 M >215 M	265 M	245 M	171 M	215 M		Potassium K
				· .	;	211 N	313 M	444 G	597 G	468 G	385 G	451 G			- 13	Magnesium Mg
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						သ				ODA NEK KA			2.1			%×
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		****		-				_							2	Copper
		,	***************************************									******		···	70	Mang.
***							4 = -2/R 3		4					 -	1	Alum

Results: P, K, Mg and Ca are extracted by Mehilch-3 (ICP) and are reported as follows: P: Approx. Bray-P1 lb/A = (M3-P * 0.7) * 2

Ratings: L=Low M=Medium G=Good H=High V=Very High

K: Approx. 1N-NH4OAc lb/A = (M3-K * 0.84) * 2

Ca: Approx. 1N-NH4OAc lb/A = (M3-Ca * 0.75) * 2

Dearson

Thairs

The water of the said

W M

165/40

13 75 10

Analyzed by Spectrum Analytic Inc. www.spectrumanalytic.com

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Client: Aubert Pearson Farm/Tract:

Prepared by: TOMMY L. REDDICK, SCT

Date: 3-31-08

659

ANIMALS PLANTS WATER ₽ Quality Suitability Quality Quantity Soft Mass Movement (hillsides, slippage or slope failures)
Road Banks, Construction Sites, Scoured Areas in Floodplains
Condition Titth - Crusting - Water Infiltration - Organic Matter Erosion Contaminants: Excess Fertilizers - Pesticides - Chemicals,
Animal Waste or Other Organics
Deposition Damage and Safety - on-site & off-site nontion Adapted to site - soll/dimate Intended Use Air Temperature, Movement, Humidity Restriction from Sediment Deposition on-site & off-site (drainage ditches, road ditches, culverts, waterbodies, streams, lakes)
Groundwater Contaminants Pesticides Airborne Sediment and Smoke - on-site & off-site Excess - Flooding/Ponding - Subsurface - Seeps Sheet & Rill Establishment - Growth - Harvest Productivity - Kinds, Amounts, Distribution Stream Bank Ephemeral Gully/Concentrated flow (usually eliminated by tillage) Animal Health - Poisonous plants, disease, parasites, insects Nutrients Health and Vigor Airborne Chemical Drift - on-site & off-site Classic Gully (Channel needs to be stabilized) opulation/Resource Balance cod, Cover, Shetter & Quantity/Quality of Water Compaction urface Water Contaminants equate Outlets Consideration Nutrients & Organics
Heary Metals - Salts Patrojens
Patrojens
Rutrients & Organics
Heary Metals - Salts Heary Metals - Salts Patrojens
Suspended Sedments
Low Dissolved Oxygen Aquatic Habitat lemperature 1235 1,2,3,5 1,2,3,5 1,2,3,5 1,2,3,5 1,2,3,5 Fields 1,2,3,5

1 of 3

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

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11. Result in the 11a.Owner ad	10. Negatively 10a. If Yes, lar BMPs or	9	Ť	.co	75	!	7	7.	នី	, ,	20	5a.	Ö		ŧ	- 1		 Negatively 	WILLTHEP			Social		Economic				HUMAN
 Result in loss of floodplain capacity? Comper advised to contact DOW for permit requirements? 	legatively impact riparian veget if Yes, landowner advised to co BMPs or permit requirements?	djacent to any state-dr	impact federally desi	Located adjacent to any federally designated wild or scenic river?	CR Review requires field investi (Further action is required)	(No further action is required)	conducted by qualifie	ny practices conside	ner advised to contact	ibutary?	DOW concerning permit requirements?	downer advised of For	Change hydrology, deposit fill, or have been abandoned?	If adverse effect is indicated, USFWS consultation Required	Use (+) positive, (0) neutral/none, (-) adverse (circle one)	n likelinood or causing	y earth disturbing activ	impact any prime or u	Special Environmental Special Environmental WILL THE PRACTICE/SYSTEM TO BE PLANNED:	IΥ	~	Υ	z	Z	Z	Z	(Y/N)	WHEN
city? for permit requir	ation in areas re ntact COE & DC	esignated specia	gnated wild or so	y designated wil	gation by qualific		d individual resu	ared as PG or G	COE & DOW 10	Call Gilallina, o	ments?	od Security Act r	remove stumps	, USFWS consu	ne, (-) adverse (c	a public contro	ities near pipelir	inique farmland	ATO BE PLANNED: (Enter Fi	~	~	· Y	z	Z	Z	z	(Y/N)	LIFESPAN
ements?	 Negatively impact riparian vegetation in areas regulated by Federal/state/local law? If Yes, landowner advised to contact COE & DOW or other authority concerning BMPs or permit requirements? 	Located adjacent to any state-designated special use waters (Sect 1 FOTG)?	8a. Negatively impact federally designated wild or scenic river? (Permit may be required)	d or scenic river?	CR Review requires field investigation by qualified archaeologist/SHPO consultation? (Further action is required)		CR review conducted by qualified individual results in "Undertaking Reviewed"	Contain any practices considered as PG or G (CR Matrix, Sect I FOTG)?	If Yes, owner advised to contact COE & DOW for permit requirements?	water or tributary?	the material being placed in any positionals	If Yes, landowner advised of Food Security Act requirements and advised to contact COE &	Change hydrology, deposit fill, or remove stumps from wetlands (W, FW, FWP) or PCs that have been abandoned?	Iltation Required)	Use (+) positive, (0) neutral/none, (-) adverse (circle one)	15	2. Include any earth disturbing activities near pipelines, electrical, or other utilities?	 Negatively impact any prime or unique farmland or scenic beauty of the area? 	ital Concerns Center Field Numbers for Yes Response)	Environmental Justice Considered during planning?	Compatible with community well-being & environmental protection?	Compatible with clients objectives, well being and safety?	High Economic risk involved?	Very high Operation and Management Level required?	Extensive Labor required?	Extensive Capital required?		CONSIDERATION
ž	z	z		z	N/A	:	z	Z		2	2		z		(z	z	z	(Y/N)		ental protec	afety?		9d?				
															1,2,3,5				FIELDS		dion?							

The Information above is based on: ___ a field review; ____ Office Records; __X__ Both (check one)

Title

Date

Signature NRCS

may require preparation of an EA or EIS. The action will be referred to the State Office.	has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required	is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.	is not a federal action. No additional analysis is required.	Findings. I have considered the effects of this action and the alternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary circumstances criteria in the instructions for form NRCS-CPA-52. I find, for the reasons stated below, that the selected alternative:
	al analysis is required.	ary circumstances. No additional analysis is		and Social Considerations; the Special for form NRCS-CPA-52. I find, for the
		(

CONSERVATION PLAN MAP

Date: 3/25/2008

Customer(s): WANDA D MIX, DISTRICE CANNO County Approximate Acres: 0

Legal Description: T-687

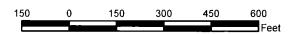
Field Office: BARDWELL PROGRAM DELIVERY POINT Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE



Legend

- Tract Boundaries
- Streams
- quads24k_a_ky039







SOIL MAP

Date: 3/25/2008

Customer(s): STEVE CANNON

District: Carlisle County
Approximate Acres: 0
Legal Description: T-687

Field Office: BARDWELL PROGRAM DELIVERY POINT Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE





Calisle County Soil Map

- Tract Boundaries
- Primary Roads
- Local Roads
- -- Streams





Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

Description Category: SC

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: LsE3 - Loring-Memphis-Saffell complex, 12 to 30 percent slopes, severely eroded

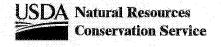
Description Category: SOI

Moderately deep and deep soils on uplands. Fragipan in Loring soils at a depth of about 1 foot slows water movement and restricts roots. Saffell soils are underlain with very gravelly material. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: MeB - Memphis silt loam, 2 to 6 percent slopes

Description Category: SOI

Silty, upland soil on broad ridges. Root zone is deep and available water capacity is high. Very erodible due to high silt content. Tilth and yield potential are good.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007

	l												

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

See enclosed Revised Univeral Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

		Planned		Applied	
l	Field	Amount	Month Year	Amount	Date
ł	Total:	14.6 ac	4 2011-2014		

Nutrient Management: (590)

Crop nutrient needs will be obtained from the application of Animal waste and commercial fertilizer according to an approved Comprehensive Nutrient Management Plan.

ľ		Planned	***************************************		Applied	
L	Field	Amount	Month	Year	Amount	Date
I	1	14.6 ac	4	2012&2014		
I	Total:	14.6 ac				

Residue and Tillage Management, Mulch Till: (345)

Following nutrient injection, Corn will be planted using residue and tillage management, mulch-till (345). Crop residues will be uniformly spread on soil surface after harvest. The soil will be tilled prior to planting using full width tillage implements such as chisels, rippers, light disking, field cultivators and/or phillips harrows. Weed control will be accomplished by a combination of tillage and herbicide applications. See the enclosed Revised Universal Soil Loss Equation (RUSLE2) record(s)for the tillage operations and residue amounts necessary to meet the planned soil loss objectives.

Field	Planned Amount	Month Year	Applied Amount	Date
1 Total:	14.6 ac 14.6 ac	4 2012&2014		

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

	Planned		Applied	
Field	Amount	Month Year	Amount	Date
1	14.6 ac	10 2012&2014		
Total:	14.6 ac			



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 687

Field(s) No: 1

				SERVE A PARAMETER A RESERVATION OF THE ANALYSIS OF THE	
			0.4	Slope leng	gth Avg. slope
	Location		5011	(horiz)	steepness. %
1	Kentucky\Carlisle	LoC3 Loring silt lo	am, 6 to 12 percent slopes, sevei	rely	
1	County		ed\Loring silt loam 85%	150	8.0
					······································

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7	Manure injector, tiquid 30 inch rows	6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence		57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96 ·
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85
11/20	Harvest, killing crop 20pct standing stubble		95



(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating w/planned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

Fuel type for entire run	
	Fuel cost for entire simulation. US\$/ac
Diesel	1 \$33.20/ac

Soil conditioning index (SCI) +0.26

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg. annual slope STIR 20.0

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

	KE	NTUCKY F	PHOSP	HORU	JS INDE	EX WC	RKSHE	ET		
Farm:			0				Date:		49-08	
Tract:			687							
					FIELD		RE VALUE F or 8 points)		S	
			Field #:	1	Acres:	14.6	Field #:		Acres:	
Field Feature	es	Weighted Factor (WF)	Existing Value	WF x Existing Value		WF x Planned Value		WF x Existing Value		WF x Planned Value
Hydrologic Soil Gro	oup ,	1	4	4	4	4				
2. Residual Soil Test	(P)	3	1	3	1	3			1	
3. Field Slope Percen	it	1	4	4	4	4				
4. Land Cover Percer	nt	3	4	12	1	3			1	
5. Vegetative Buffer V	Vidth	3	8	24	8	24			1	
6. Ag. Impaired Water	rshed	1	1	1	1	1			1	
7. Application Timing		3	4	12	2	6			1	
8. Application Method		3	8	24	1	3				
9. Distance To Waterl	body	2	2	4	2	4				
10. MLRA Location		1	2	2	2	2				
FIELD FEATURES IND TOTALS	DEX		Existing Total*	90	Planned Total	54	Existing Total*	0	Planned Total	0

	Field Vulnerability for Phosphorus Loss
Total Points from P	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

Soil Ana

Spectrum Analytic Onc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

BARDWELL, KY 42023 AGRI-CHEM Report To 2351 US 51N

> Prepared For STEVE CANNON Account - AGRI CHEM

Tested Sampled

> 10-24-2007 10-16-2007

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DOCS-8))) (S-7	DOCS-5)OCS-4	DOCS-3	DOCS-2	DOCS-1	Sam
		} } }	+	2	Dorth 3		Sample Number
C02980	C02978 C02979	C02977	C02976	C02975	C02974	C02973	Lab Number
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<u> </u>	 _ 6	<u></u>	0.9	<u>1</u>	1.4	₽	Walfer %
25 L	27 L	35 M	133 H	123 H	32 M	62 G	Phosphorus P.
92 L	170 M	101 L	185 M	232 M	129 L	217 M	Potassium K
276 M	363 G	269 M	157 M	331 G	516 G	611 G	Magnesium Mg
1218 M	1667 M	1481 M	1968 H	1631 M	1502 L	4070 G	Calcium Ca
0 0 0	11.9	9.8	, (2)	<u></u>	15.7	15.2	CEC
	∞ <u>∞</u> ∠					 	K Wg
1.2 29.5	12.7 35.0 15.9 19.3		11.2 84.7		13.7 24.0	16.7 66.9	% % %
							Salfar S
							Boron B
22 c	4 c ≥ ≥	4 M	ි ග	ം ഒ	_ 4 <u>Z</u>	2	Zine Zii
							Log
							Copper
						Ī	Mang.
							Alum.

Stere Cannon. Doc Mich Farm on Many 80 a annual achie bunt calinpond.

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Client: Wanda Mix

Prepared by: TOMMY L. REDDICK, SCT

Farm/Tract: <u>T-687</u>

Date: 3-25-08

PLANTS ANIMALS WATER Quantity AR Mgt Airborne Odors

Condition Air Temperature, Movement, Humidity
Sultability Adapted to site + soli/climate Quality Erosion ondition Contaminants: Excess Fertilizers - Pesticides -- Chemicals, Animal Waste or Other Organics (<u>sposition</u> Darmage and Safety - on-site & off-site Intended Use Productivity - Kinds, Amounts, Distribution Restriction from Sediment Deposition on-site & off-site (drainage ditches, mad ditches, culverts, waterbodies, streams, lakes)
Groundwater Contaminants
Pesticides Airborne Sediment and Smoke - on-site & off-site
Airborne Chemical Drift - on-site & off-site Excess - Flooding/Ponding - Subsurface - Seeps Food, Cover, Shefter & Quantity/Quality of Water Establishment - Growth -- Harvest Soil Mass Movement (hillsides, slippage or slope failures)
Road Banks, Construction Sites, Scoured Areas in Floodplains
Tittn - Crusting - Water Infiltration - Organic Matter Population/Resource Balance Ephemeral Guily/Concentrated flow (usually eliminated by tillage) lealth and Vigor Surface Water Contaminants Sheet & Rill Classic Gully (Channel needs to be stabilized) Compaction tream Bank adequate Outlets Nutrients & Organics
Heavy Metals - Salts Pathogens
Pesticides Nutrients & Organics
Heavy Metals - Safts
Pathogens
Suspended Sediments
Low Dissolved Oxygen Aquatic Habitat emperature :

1 of 3

Animal Health - Poisonous plants, disease, parasites, insects

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

The Information above is based on: a field review; Office Records;X Both (ch	
Special Environnia (DEISYSTEM TO BE PLANNED It any prime or unique farmand or Idisturbing activities near pipelin hood of causing a public contro, (O) neutralinone, (-) adverse (c) ect is indicated, USPWS county Act in public prime or advised of Food Security Act in I permit requirements? Iffication of a stream channel, or Noted to contact COE & DOW to sortices considered as PG or G on is required) ires field investigation by qualified individual estimated with the any state-designated wild or so it to any state-designated wild or so if to any state-designation in areas re re advised to contact COE & DO requirements? Toodplain capacity? Toodplain capacity?	WILL THE PRACTICESTYSTEM Y Environmental subset Confidence Considerations with community with the previous part of the transfer of the previous part o
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NRCS Title	is not a federal action. No additional analysis is required. is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No required. X has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required. may require preparation of an EA or EIS. The action will be referred to the State Office. Rationale supporting the finding.
Signature NRCS Title Cate Findings. I have considered the effects of this action and the alternatives on the Resource, Economic, and Social Considers Environmental Concerns, and the extraordinary droumstances criteria in the instructions for form NRCS-CPA reasons stated below, that the selected alternative:	is categorically excluded from further environmental analysis and there are no extraordinary circumstances. N required. X has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required may require preparation of an EA or EIS. The action will be referred to the State Office. Rationale supporting the finding.
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CONSERVATION PLAN MAP

Date: 3/26/2008

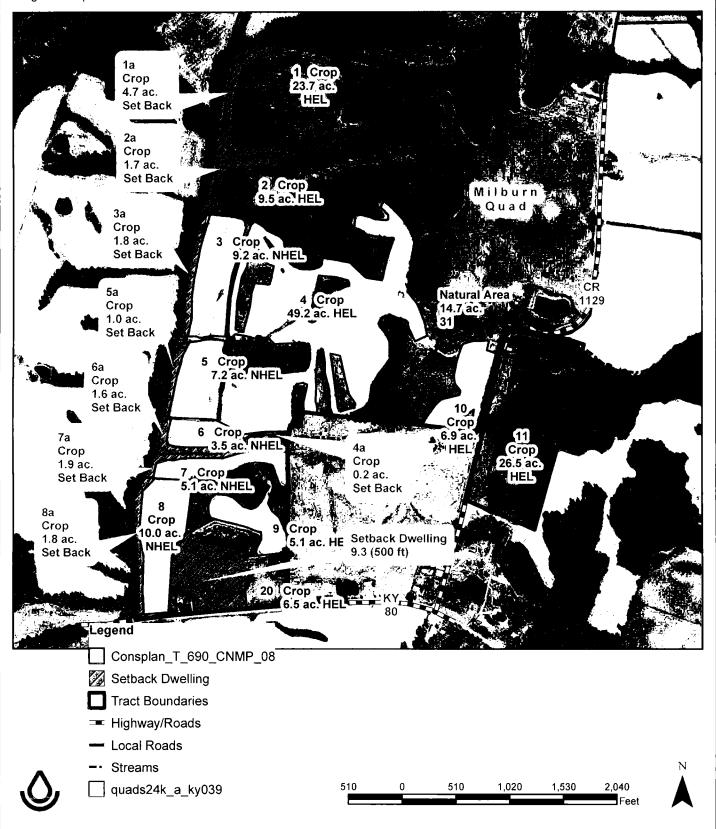
Customer(s): WANDA D MIX, STEVE CANNON

District: Carlisle County

Legal Description: FSN-519 T-690

Field Office: BARDWELL PROGRAM DELIVERY POINT Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE



SOIL MAP

Date: 3/26/2008

Customer(s): WANDA D MIX District: Carlisle County

Approximate Acres: 0

Legal Description: FSN-519 T-690

Field Office: BARDWELL PROGRAM DELIVERY POINT Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE



Legend

Calisle County Soil Map

Tract Boundaries

County Boundary

- Primary Roads

- Local Roads

-- Streams





Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Ad - Adler silt loam, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soil that is subject to flooding in winter and spring. Seasonal water table at about 2 feet.

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOL

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoC2 - Loring silt loam, 6 to 12 percent slopes, eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability and moderate yield potential. Erodibility is very high.

Map Unit: LoC3 - Loring silt loam, 6 to 12 percent slopes, severely eroded

Description Category: SOI

Upland soil with a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is mostly subsoil due to past erosion. Low yield potential. Best suited to pasture and hay.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

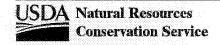
Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: LsE3 - Loring-Memphis-Saffell complex, 12 to 30 percent slopes, severely eroded

Description Category: SOI

Moderately deep and deep soils on uplands. Fragipan in Loring soils at a depth of about 1 foot slows water movement and restricts roots, Saffell soils are underlain with very gravelly material. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007

Tract: 690

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

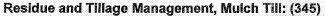
See enclosed Revised Univeral Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	23.7 ac	4	2011-2014		
2	9.5 ac	4	2011-2014		
3	9.2 ac	4	2011-2014		
4	49.2 ac	4	2011-2014		
5	7.2 ac	4	2011-2014		
6	3.1 ac	4	2011-2014		
7	5.1 ac	4	2011-2014		
8	10 ac	4	2011-2014		
9	5.1 ac	4	2011-2014		
10	6,9 ac	4	2011-2014		
11	26.5 ac	4	2011-2014		
20	6.5 ac	4	2011-2014		
Total:	162 ac				

Nutrient Management: (590)

Crop nutrient needs will be obtained from the application of Animal waste and commercial fertilizer according to an approved Comprehensive Nutrient Management Plan.

Field	Planned Amount	Month	Year	Applied Amount	Date
	23.7 ac	4	2012&2014		
2	9.5 ac	4	2012&2014		
3	9.2 ac	4	2012&2014		
4	49.2 ac	4	2012&2014		
5	7.2 ac	4	2012&2014		
6	3.1 ac	4	2012&2014		
7	5.1 ac	4	2012&2014		
8	10 ac	4	2012&2014		
9	5.1 ac	4	2012&2014		
10	6.9 ac	4	2012&2014		
11	26.5 ac	4	2012&2014		
20	6.5 ac	4	2012&2014		
Total:	162 ac				



Following injection of nutrients, Corn will be planted using residue and tillage management, mulch-till (345).

Crop residues will be uniformly spread on soil surface after harvest. The soil will be tilled prior to planting using full width tillage implements such as chisels, rippers, light disking, field cultivators and/or phillips harrows. Weed control will be accomplished by a combination of tillage and herbicide applications. See the enclosed Revised Universal Soil Loss Equation (RUSLE2) record(s)for the tillage operations and residue amounts necessary to meet the planned soil loss objectives.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	23.7 ac	4	2012&2014		
2	9.5 ac	4	2012&2014		
3	9.2 ac	4	2012&2014		
4	49.2 ac	4	2012&2014		
5	7.2 ac	4	2012&2014		
6	3.1 ac	4	2012&2014		
7	5.1 ac	4	2012&2014		
8	10 ac	4	2012&2014		
9	5.1 ac	4	2012&2014		
10	6.9 ac	4	2012&2014		
11	26.5 ac	4	2012&2014		
20	6.5 ac	4	2012&2014		
Total:	162 ac				



Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

Field	Planned Amount	Month	Year	Applied Amount	Date
1	23.7 ac	10	2012&2014		
2	9.5 ac	10	2012&2014		
3	9.2 ac	10	2012&2014		
4	49.2 ac	10	2012&2014		
5	7.2 ac	10	2012&2014		
6	3.1 ac	10	2012&2014		
7	5.1 ac	10	2012&2014		
8	10 ac	10	2012&2014		
9	5.1 ac	10	2012&2014		
10	6.9 ac	10	2012&2014		
11	26.5 ac	10	2012&2014		
20	6.5 ac	10	2012&2014		
Total:	162 ac				



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon

Tract No: 690

Field(s) No: 1, 2, 4, 9, 10, 11, 20

Location	Soil	Slope length (horiz)	Avg. slope steepness, %
Kentucky\Carlisle County	LoC3 Loring silt loam, 6 to 12 percent slopes, severely eroded\Loring silt loam 85%	150	8.0

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7	Manure injector, liquid 30 inch rows	6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps	o Lo ganonia dore	69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence		57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Garlic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85
11/20	Harvest, killing crop 20pct standing stubble		95



(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating w/planned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

Fuel type for entire run		Fuel	cost for entire simulation, US\$/ac
Diesel			\$33.20/ac

Soil conditioning index (SCI) +0.26

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg. annual slope STIR 20.0

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.



Bottomland –(Spring Inject LiquidManure + Disk) Followed by Conv Corn, Mulch Till Wheat (Disk2x, And broadcast wheat and No-till Double Crop beans.

RUSLE2 Profile Erosion Calculation Record

Operator – Steve Cannon

Tract No: 690

Field No 3, 5, 6, 7, & 8

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Location	Soil Slope length	Avg. slope
Kanton la VO alla la	(horiz)	steepness, %
Kentucky/Cariisle	Cn Convent-Adler silt loams, frequently	0.75
Lounty	flooded\Convent silt loam 50%	<u> </u>

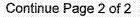
Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Corn, grain	bushels	140
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Wheat, winter, mid- south	Bushels	55
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Disk1x) CT_Corn, MT Wheat (Disk2x-lite, broadcast) and No-till Beans#2	Soybean, mw 15 - 20 in rows	bu	35

Contouring		Diversion/terrace, sediment	Subsurface	Adjust res.	General yield	Rock
	Ш	basin	drainage	burial level	level	cover, %
a. rows up-and-		(none)	(none)	Normal res.	NASS	6
down hill	L	No. 100 Personal Control of the Cont	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	burial	117.00	

Outputs:

T	Soil loss	Detachment on	Soil loss for Sedin	nent Net C	Net K	Crit. slope	Surf. cover after
value	erod. portion	slope	cons. plan deliv	ery factor	factor	lenath	planting, %
5.0	1.1	1.1	1.1 1.1	1 0.075	0.47		

Aprox Date (+/- 2 weeks)	Operation	Description	Surf. res. cov. after op, %
4/26	Manure injector, liquid 30 inch	2522 gallons/ac	77
4/29	Disk, tandem secondary op.		39
4/30	Planter, double disk opnr	Corn, grain	39
5/15	Sprayer, Herbicide post emergence	3	34
9/20	Harvest, killing crop 20pct standing stubble		92
10/1	Disk, tandem light finishing		68
10/5	Disk, tandem light finishing		44
10/10	Planting, broadcast seeder	Wheat, winter, mid-south	43
3/15	Top Dress Wheat (Commercial Fertilizer)	See AGR-1	30
4/10	Sprayer, Herb post emergence		26
6/20	Harvest, killing crop 20pct standing stubble		92
6/23	Sprayer, kill crop		91
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20 in rows	91
7/15	Sprayer, Herb post emergence	7777	88
8/15	Sprayer, Herb post emergence		84
9/15	Sprayer, Herb post emergence		80
11/20	Harvest, killing crop 20pct standing stubble		94



FUEL USE EVALUATION:

	Fuel type for entire	Equiv. diesel use for entire Energy use for entire	Fuel cost for entire simulation,
-	run	simulation simulation	US\$/ac
- [Diesel	9.7 1300000	32.9

SCI and STIR Output

Soil conditioning index (SCI)	Avg. annual slope STIR	Wind & irrigation-induced erosion for SCI, t/ac/yr
0.53	41.4	0

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

	KENTUCKY I	PHOSP	HORI	JS INDE	x wo	RKSHE	ET			
Farm:		519				Date:		April 9, 2008	3	
Tract:		690								
				FIELD I		E VALUE For 8 points)	E VALUE RATINGS or 8 points)			
		Field #:	1	Acres:	23.7	Field #:	2	Acres:	9.5	
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	
Hydrologic Soil Group	1	4	4	4	4	2	2	2	2	
2. Residual Soil Test (P)	3	1	3	1	3	1	3	1	3	
Field Slope Percent	1	4	4	4	4	1	1	1	1	
4. Land Cover Percent	3	4	12	1	3	8	24	4	12	
5. Vegetative Buffer Widt	h 3	8	24	8	24	8	24	8	24	
6. Ag. Impaired Watersho	ed 1	1	1	1	1	1	1	1	1	
7. Application Timing	3	4	12	2	6	4	12	2	6	
8. Application Method	3.	8	24	1	3	8	24	1	3	
9. Distance To Waterbod	y 2	2	4	2	4	2	4	2	4	
10. MLRA Location	1	2	2	2	2	2	2	2	2	
FIELD FEATURES INDEX		Existing Total*	90	Planned Total	54	Existing Total*	97	Planned Total	58	

Service 1	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

K	ENTUCKY F	PHOSP	HORU	JS INDE	x wo	RKSHE	ET			
Farm:		519				Date:		April 9, 200	8	
Tract:		690								
				FIELD I		E VALUE R or 8 points)	E VALUE RATINGS or 8 points)			
		Field #:	4	Acres:	49.2	Field #.	3	Acres:	9.2	
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	Existing Value	WF-x Existing Value	Planned Value	WF x Planned Value	
Hydrologic Soil Group	1	4	4	4	4	2	2	2	2	
Residual Soil Test (P)	3	1	3	1	3	1	3	1	3	
Field Slope Percent	%, 1	4	4	4	4	1	1	1	1	
4. Land Cover Percent	3.59	4	12	1	3	8	24	4	12	
5. Vegetative Buffer Width	¥ 3	8	24	8	24	8	24	8	24	
6. Ag. Impaired Watershed	1	1	1	1	1	1	1	1	1	
7. Application Timing	3	4	12	2	6	4	12	2	6	
8. Application Method	3	8	24	1	3	8	24	1	3	
9. Distance To Waterbody	2	2	4	2	4	2	4	2	4	
10. MLRA Location	. 1	2	2	2	2	2	2.	2	2	
FIELD FEATURES INDEX TOTALS		Existing Total*	90	Planned Total	54	Existing Total*	97	Planned Total	58	

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

KE	NTUCKY F	PHOSP	HORU	JS INDE	X WC	RKSHE	ΞT		231
Farm:		519			, and a second	Date:		April 9, 200	8
Tract:	Tract:								
				FIELD		E VALUE R or 8 points)	ATING:	S	
		Field #:	5	Acres:	7.2	Field #:	6	Acres:	3.5
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planne Value	HEXISTING	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Soil Group	1	2	2	2	2	2	2	2	2
2. Residual Soil Test (P)	3	1	3	1	3	1	3	1	3
3. Field Slope Percent	1	1	1	1	1	1	1	1	1
4. Land Cover Percent	3	8	24	4	12	8	24	4	12
5. Vegetative Buffer Width	3	8	24	8	24	8	24	8	24
6. Ag. Impaired Watershed	1	1	1	1	1	1	1	1	1
7. Application Timing	9.3	4	12	2	6	4	12	2	6
8. Application Method	3	8	24	1	3	8	24	1	3
9. Distance To Waterbody	2	2	4	2	4.	2	4	2	4
10. MLRA Location	1.2	2	2	2	2	2	2	2	2
FIELD FEATURES INDEX FOTALS		Existing Total*	97	Planned Total	58	Existing Total*	97	Planned Total	58

7. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

	KENTUCKY I	PHOSP	HORL	IS INDE	X.WO	RKSHE	ET							
Farm:		519				Date:	F	pril 9, 200	8					
Tract:		690												
					FIELD FEATURE VALUE RATINGS (1,2,4, or 8 points)									
		Field #:	7	Acres:	5.1	Field #:	8	8 Acres: 10						
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value					
Hydrologic Soil Group	p	2	2	2	2	2	2	2	2					
2. Residual Soil Test (P) 3	1	3	1	3	1	3	1	3					
3. Field Slope Percent	1	1	1	1	1	1	1	1	1					
4. Land Cover Percent	3	8	24	4	12	8	24	4	12					
5. Vegetative Buffer Wid	dth 3	8	24	8	24	8	24	8	24					
6. Ag. Impaired Watersl	ned 1	1	1	1	1	1	1	1	1					
7. Application Timing	3	4	12	2	6	4	12	2	6					
8. Application Method	3	8	24	1	3	8	24	1	3					
9. Distance To Waterbo	dy 2	2	4	2	4	2	4	2	4					
10. MLRA Location	8. mg 1	2	2	2	2	2	2	2	2					
FIELD FEATURES INDE TOTALS	EX Property	Existing Total*	97	Planned Total	58	Existing Total*	97	Planned Total	58					

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

K	ENTUCKY F	PHOSP	HORL	JS INDE	EX WO	RKSHE	ET	100 100 100				
Farm:		519				Date:	1	April 9, 2008	8			
Tract:		690										
			FIELD FEATURE VALUE RATINGS (1,2,4, or 8 points)									
		Field #:	9	Acres:	5.1	Field #:	10	Acres:	Acres: 6.9			
Field Features	Weighted Factor (WF)	Existing Value	WF x Existing Value	Planned Values	WF x Planned Value	Existing Value	WF x Existing Value	Planned Value	WF x Planned Value			
Hydrologic Soil Group	1	4	4	4	4	4	4	4	4			
2. Residual Soil Test (P)	3	1	3	1	3	1	3	1	3			
3. Field Slope Percent	1	4	4	4	4	4	4	4	4			
4. Land Cover Percent	3	4	12	1	3	4	12	1	3			
5. Vegetative Buffer Width	3	8	24	8	24	8	24	8	24			
6. Ag. Impaired Watershed	1	1	1.	1	1	1 1	1	1	1			
7. Application Timing	3	4	12	2	6	4	12	2	6			
8. Application Method	3	8	24	1	3	8	24	1	3			
9. Distance To Waterbody	2	2	4	2	4	2	4	2	4			
10. MLRA Location	1:	2	2	2	2	2	2	2	2			
FIELD FEATURES INDEX TOTALS		Existing Total*	90	Planned Total	54	Existing Total*	90	Planned Total	54			

	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

KI	ENTUCKY F	HOSP	HORL	JS INDE	x wo	RKSHE	ĒΤ		
Farm:		519				Date:	/	April 9, 2008	8
Tract:		690							
				FIELD F		E VALUE Ra or 8 points)	ATINGS	3	
		Field #:	11	Acres:	26.5	Field #:_	20	Acres:	6.5
Field Features	Weighted Factor (WF)	Existing *Value	WF x Existing Value	Planned Value	WF x Planned Value	III Victing I	WF x Existing Value	Planned Value	WF x Planned Value
Hydrologic Soil Group	assis 1	4	4	4	4	4	4	4	4
Residual Soil Test (P)	3	1	3	1	3	1	3	1 1	3
Field Slope Percent	1	2	2	2	2	4	4	4	4
4. Land Cover Percent	3	4	12	1	3	4	12	1	3
5. Vegetative Buffer Width	3	8	24	8	24	8	24	8	24
6. Ag. Impaired Watershed	Shift county of Philosophy and County of the	1	1	1	1	1	1	1	1
7. Application Timing	3	4	12	2	6	4	12	2	6
8. Application Method	3	8	24	1	3	8	24	1	3
9. Distance To Waterbody	2	2	4	2	4	2	4	2	4
10. MLRA Location	1	2	2	2	2	2	2	2	2
FIELD FEATURES INDEX TOTALS	THE PROPERTY OF THE PROPERTY O	Existing Total*	88	Planned Total	52	Existing Total*	90	Planned Total	54 .

100	Field Vulnerability for Phosphorus Loss
Total Points from P	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

Spectrum Analytic Inc P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

BARDWELL, KY 42023 AGRI-CHEM 2351 US 51N Report To

> Prepared For Account - AGRI-CHEM STEVE CANNON

Tested Sampled 04-10-2008 04-15-2008

				ر ص	.г. ў			Y	T :	<u>;</u>	3) = = =================================		:
	AGRI			HD STEVE	EHIND HAI	WANDA BACK 40	ARSON SAWMILL &	EARSON	TOB BARN MIY	WANDA HILL MANG	WANDA BITM	FRNI CARLYS 3	BHU CARLY SHOP	Sample Number
	AGRI-Cher		Stay Say	BHD STEVE SHOP (1) F22197	BEHIND HAROLD	CK 40	SAWMILL &	3IG FLD &	ZXX.	L 1.6.10	M	Ϋ́S	SHOP	Number
TORK	7 7		Sep.	F22197	F22196	F22195	F22194	F22193	F22192	F22191	F22190	F22189	F22188	Lab Number
3	100		, ,	6.2	6,6	.5 .8	6.5	5.9	5.6	5.8	6.7	6.1	6.0	Soll Ha
+000	- 2			6.9	7.0	6.6	7.1	6.6	6.6	6.6	7.1	6.9	6.8	Butter
**************************************			****	<u>.</u> 6	2.1	2.0	1.8	<u></u> 4.	2.0	1.7	1.6	1.6	1.7	Matter %
,				59 M	69 G	49 M	38 M	43 M	29 L	(22)	42 M	28 L	74 G	Phosphoru P
					237	254 M	249 M	_	265	245	171 M	215 M	242 M	Phosphorus Polassium
			:	211 M	313 M	444 G	597 G	468 G	385 G	451 G	218 M	227 M	331 G	Maggas/um Mg
		,		-	3351 G	2513 G	4478 G			2678 G		2703 H	2559 G	Calcium
		;			٠.	ည် ယ					10.5	9.2	10.5	aEC.
				3.9	2.4	2.5	1.8	2,2	26	2. 3.	2.1	3.0	3.0	%×
·	~ :	· .		9.8	10.5	13:9 9:0	13.9	15.7	12.5	13.7	8.7	10.3	13.1	% %0
			······································	72.8	67.1	47.4	62.5	43.3	47.6	48.9	71.2	73.6	61.0	22
·		·		19 M	22 G	20 G	17 M	20 G	20 G	15 M	18 M	18 M	16 M	Sulfur
		-												Boron B
7830x300xxxxxxxxxxxxxxxxx		***						ω i ≤ :				2 X	4 G	Zinc Zn
T	Mark was agir sapida a sha sana													Fon F
	· ·····													Capper
		···									··			Mang.
			SPC-k	#				*****						Alum

Results: P, K, Mg and Ca are extracted by Mehlich-3 (ICP) and are reported as follows: P: Approx. Bray-P1 Ib/A = (M3-P * 0.7) * 2
Ratings: L=Low M=Medium G=Good H=High V=Very High

K: Approx. 1N-NH4OAc Ib/A = (M3-K * 0.84) * 2

Mg: Approx. 1N-NH4OAc lb/A = (M3-Mg * 0.88) * 2 Ca: Approx. 1N-NH4OAc lb/A = (M3-Ca * 0.75) * 2

(0 .() () のらり Fills 3, 5, 6, 78 = F. P. S. 12 11, 9, 10, 11, 20 42 los 140 DA Jos AC

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Prepared by: TOMMY L. REDDICK, SCT Farm/Tract: T-690

Date: 3-27-08

	Mot	ANIMALS Habitat			Mgt.		Condition		PLANTS Suitability	Condition	<u> </u>		AIR Quality								Quality		WATER Quantity	Deposition		Condition						SOIL
Animal Health - Poisonous plants, disease, parasites, insects	Population/Resource Balance	Food; Cover, Shelter & Quantity/Quality of Water	Pests	Nutrients	Establishment - Growth - Harvest	Health and Vigor	Productivity - Kinds, Amounts, Distribution	ļ.,_	(x) Adapted to site - soll/dimate	20 Air Temperature, Movement, Humidity	Altborne Odors	Airborne Chemical Drift - on-site & off-site	Ŀ	Temperature	Low Dissolved Oxygen	Suspended Sediments	Pathogens	Nutrients & Organics	Surface Water Contaminants Pesticides	Nutrients & Organics		 Inadequate Outlets	Excess - Flooding/Ponding - Subsurface - Seeps	ion Damage and Safety - on-site & off-site	Compaction		Road Banks, Construction Sites, Scoured Areas in Floodplains	Soil Mass Movement (hillsides, slippage or slope failures)	Stream Bank	Classic Gully (Channel needs to be stabilized)	Ephemeral Gully/Concentrated flow (usually eliminated by fillage)	
			all	all								all						2							all	all		-			all	a

SPECIAL ENVIRONMENTAL CONCERNS

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

		SF			L EN	VIR	ON	ME	NTA	LC	ON	ICE	RN	S		_	_											Ξ
- 1 - 1 - 1	10a.		80	8	76.0	á	7.7	6a.	ं ठ < प्र	_	5 a	ب ص		4.	ι Ξ	2 1	-	≨										NAMON
Result in loss	legatively im If Yes, lando BMPs or per	ocated adjac	legatively im	ocated adjac	R Review re	(No further a	Contain any	f Yes, owner	water or tributary?	OW concern	If Yes, landowner advise	hange hydro	(If adverse	Affect any su	lave a high li	ıclude any ex	legatively im	L THE PRA				Social		Economic				
 Result in loss of floodplain capacity? Appendix advised to confact DOW for permit requirements? 	Negatively impact riparian vegets if Yes, landowner advised to cor EMPs or permit requirements?	ent to any state-de	pact federally desig	Located adjacent to any federally designated wild or scenic river?	CR Review requires field investig	(No further action is required)	practices conside	advised to contact	nodification of a str tary∕≀	DOW concerning permit requirements?	vner advised of Foc	logy, deposit fill, or	If adverse effect is indicated, USFWS consultation Required	Affect any suspected threatened or endangered species, (Use (+) positive, (0) peritral/none, (-) adverse (circle one)	kelihood of causing	arth disturbing activ	oact any prime or u	WILL THE PRACTICE/SYSTEM TO BE PLANNED:	Spec	Υ	Υ	Υ	z	z	Z	Z	(YIN)	WHEN
ity? or permit requir	ation in areas re tract COE & DC	signated specia	inated wild or si	/ designated wil	jation by qualifi	a individual rest	red as PG or G	COE & DOW fo	eam channel, or	nents?	nd Security Act i	remové stumps	USFWS cons	or endangered	a public contro	ities near pipelii	nique farmland	BE PLANNEI	Special Environmental Concerns	~	Υ	Υ	Z	z	Z	z	(Y/N)	LIFESPAN
ements?	 Negatively impact riparian vegetation in areas regulated by Federal/state/local law? If yes, landowner advised to contact COE & DOW or other authority concerning BMPs or permit requirements? 	Located adjacent to any state-designated special use waters (Sect 1 FOTG)?	8a. Negatively impact federally designated wild or scenic river? (Permit may be required)	d or scenic river?	CR Review requires field investigation by qualified archaeologist/SHPO consultation? (Further action is required)	(No further action is required)	Contain any practices considered as PG or G (CR Matrix, Sect I FOTG)?	If Yes, owner advised to contact COE & DOW for permit requirements?	Result in the modification of a stream channel, or till material being placed in any navigable water or tributary?		If Yes, landowner advised of Food Security Act requirements and advised to contact COE &	Change hydrology, deposit fill, or remove stumps from wetlands (W, FW, FWP) or PCs that	Itation Required)	Affect any suspected threatened or endangered species, or their habitat? (Indian Bat)	Have a high likelihood of causing a public controversy? (Animal Waste, Burning)	Include any earth disturbing activities near pipelines, electrical, or other utilities?	 Negatively impact any prime or unique farmland or scenic beauty of the area? 	D: (Enter Field Numbers for Yes Response)	ital Concerns	Environmental Justice Considered during planning?	Compatible with community well-being & environmental protection?	Compatible with clients objectives, well being and safety?	High Economic risk involved?	Very high Operation and Management Level required?	Extensive Labor required?	Extensive Capital required?		CONSIDERATION
ž	z	z		z	N/A	z	z		z			z		(z	z	z	(Y/N)			ntal protec	ifety?		d 7				
														ALL				FIELDS			tion?							

The Information above is based on: ____ a field review; ____ Office Records; __X__ Both (check one)

Title

Signature NRCS

Findings.	Findings. I have considered the effects of this action and the alternatives on the Resource, Economic, and Social Considerations; the Special Environmental Concerns; and the extraordinary circumstances criteria in the instructions for form NRCS-CPA-52. I find, for the reasons stated below, that the selected alternative:
	is not a federal action. No additional analysis is required.
	is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.
×	has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required.
	may require preparation of an EA or EIS. The action will be referred to the State Office.
Rationale s	Rationale supporting the finding

1 of 3

Conservation Plan Map

Date: 4/16/2008

Customer(s): STEVE CANNON

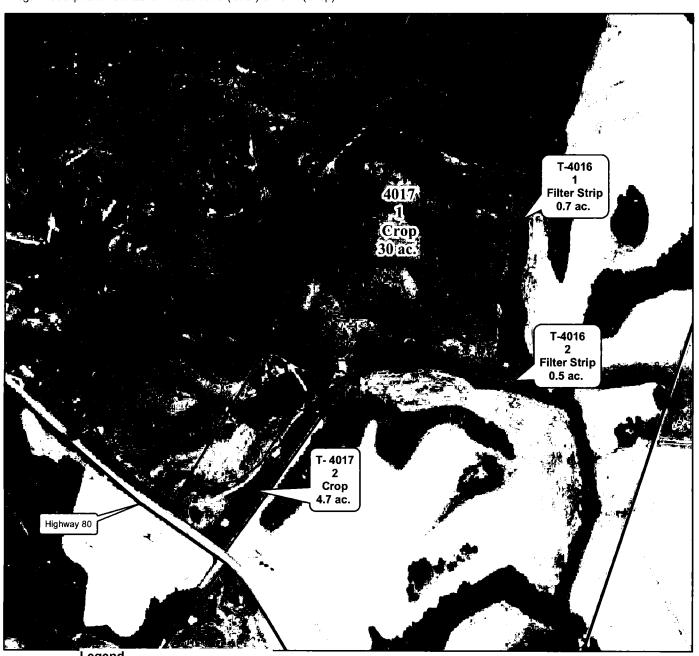
District: BARDWELL SOIL & WATER CONSERVATION DISTRICT

Approximate Acres: 48.4

Legal Description: FSN-2240 Tract-4016 (CRP) & 4017 (Crop)

Field Office: BARDWELL PROGRAM DELIVERY POINT

Agency: USDA - NRCS Assisted By: Tommy Reddick State and County: KY, HICKMAN



Legend

- Consplan_T_4016_&_T_4017
- Filter Strip
- Waterway
- Primary Roads
- Local Roads
- Streams

1 inch equals 500 feet







SOIL MAP

Date: 3/25/2008

Customer(s): STEVE CANNON

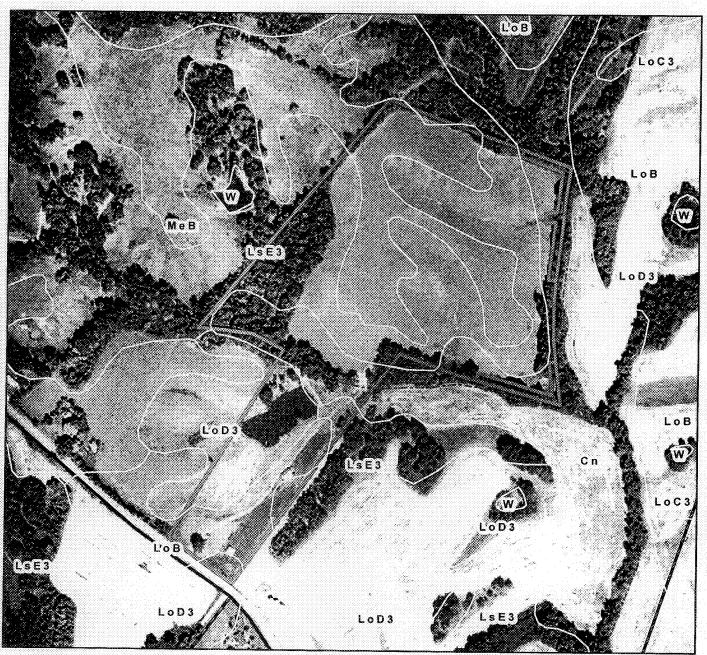
District: Carlisle County
Approximate Acres: 48.1

Legal Description: FSN-2240 T-4016 & 4017

Field Office: BARDWELL PROGRAM DELIVERY POINT

Agency: Natural Resources Conservation Service

Assisted By: Tommy L Reddick State and County: KY, CARLISLE



Legend

Calisle County Soil Map

Tract Boundaries

County Boundary

- Primary Roads

Local Roads

-- Streams





Map Unit Description (Brief)

Carlisle and Hickman Counties, Kentucky

[Only those map units that have entries for the selected non-technical description categories are included in this report]

Map Unit: Cn - Convent-Adler silt loams, frequently flooded

Description Category: SOI

Loamy, nearly level bottom soils that are subject to flooding mostly in winter and spring. Seasonal high water table from 12 to 24 inches.

Map Unit: LoB - Loring silt loam, 2 to 6 percent slopes

Description Category: SOI

Upland soil that has a fragipan at a depth of about 2 feet that slows water movement and restricts roots. The soil has good workability, moderate yield potential, and is very highly erodible without ground cover.

Map Unit: LoD3 - Loring silt loam, 12 to 20 percent slopes, severely eroded

Description Category: SOI

Upland soil that has a fragipan at a depth of about 1 foot that slows water movement and restricts roots. The plow layer is nearly all subsoil due to past erosion. Yield potential is low: Best suited to pasture and hay.

Map Unit: LsE3 - Loring-Memphis-Saffell complex, 12 to 30 percent slopes, severely eroded

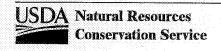
Description Category: SOI

Moderately deep and deep soils on uplands. Fragipan in Loring soils at a depth of about 1 foot slows water movement and restricts roots. Saffell soils are undertain with very gravelly material. The plow layer is nearly all subsoil due to past erosion. Yield potential is low. Best suited to pasture and hay.

Map Unit: MeB - Memphis silt loam, 2 to 6 percent slopes

Description Category: SOI

Silty, upland soil on broad ridges. Root zone is deep and available water capacity is high. Very erodible due to high silt content. Tilth and yield potential are good:



Tabular Data Version: 5
Tabular Data Version Date: 12/17/2007

Conservation Crop Rotation: (328)

Continuous rotation of Mulch-till Corn, No-till Wheat and No-till Soybeans.

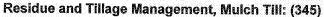
See enclosed Revised Univeral Soil Loss Equation (RUSLE2) record for the Soil Condition Index (SCI) evaluation of this crop rotation in combination with the supporting residue and tillage management systems.

	Planned		Applied
Field	Amount	Month Year	Amount Date
1	30 ac	4 2011-2014	
2	4.7 ac	4 2011-2014	
Total:	34.7 ac		

Nutrient Management: (590)

Crop nutrient needs will be obtained from the application of Animal waste and commercial fertilizer according to an approved Comprehensive Nutrient Management Plan.

	Planned		Applied	
Field	Amount	Month Year	Amount	Date
1	30 ac	4 2012&2014		
2	4.7 ac	4 2012&2014		
Total:	34.7 ac			



Following injection of nutrients, Corn will be planted using residue and tillage management, mulch-till (345).

Crop residues will be uniformly spread on soil surface after harvest. The soil will be tilled prior to planting using full width tillage implements such as chisels, rippers, light disking, field cultivators and/or phillips harrows. Weed control will be accomplished by a combination of tillage and herbicide applications. See the enclosed Revised Universal Soil Loss Equation (RUSLE2) record(s)for the tillage operations and residue amounts necessary to meet the planned soil loss objectives.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	30 ac	4 2	012&2014		
2	4.7 ac	4 2	012&2014		
Total:	34.7 ac				

Residue and Tillage Management, No-Till: (329)

Wheat and Soybeans will be planted using residue and tillage management, no-till (329).

Crop residue will be uniformly distributed and soil left undisturbed from harvest to spring planting (except for nutrient injection). Planting will be accomplished in a narrow seedbed or slot created by coulters, row cleaners or disk openers. Weed control will be accomplished by herbicide applications. See enclosed Revised Universal Soil Loss Equation (RUSLE2) erosion calculation record for estimates of residue amounts needed to meet planned soil loss objectives.

	Planned		Applied
Field	Amount	Month Year	Amount Date
1	30 ac	10 2012&2014	
2	4.7 ac	10 2012&2014	
Total:	34.7 ac		

								į				

Filter Strip: (393)

Filter Strips (393) consisting of introduced grasses and legumes will be established for the primary purpose of protecting surface waters adjacent to cropland from Ag runoff of Sediments, Pesticides and Nutrients. Filter Strip will be established according NRCS Job Sheet CRP-JS-CP-21 and managed and maintained for duration of contract according to KY-NRCS-JS-CRP Management / Maintenance Job Sheet.

	Planned		Applied	
Field	Amount	Month Year	Amount	Date
1	0.7 ac	9 2002	0.7 ac	9/30/2002
2	0.5 ac	9 2002	0.5 ac	9/30/2002
Total:	1.2 ac		1.2 ac	

Upland Wildlife Habitat Management: (645)

Wildlife habitat will be managed annually according to KY-NRCS-JS-CRP Management / Maintenance Job sheet.

	Planned			Applied	
Field	Amount	Month	Year	Amount	Date
1	0.7 ac	9	2002	0.7 ac	9/30/2002
2	0.5 ac	9	2002	0.5 ac	9/30/2002
Total:	1.2 ac			1.2 ac	



Spring (Inject Liq Manure +Field Cultivator 1x) plant Mulch Till Corn, followed by No-till Wheat and No-till Double Crop Soybeans.

RUSLE2 Profile Erosion Calculation Record

Operator - Steve Cannon Tract No: 4016 & 4017 Field

Field(s) No: 1 & 2

r				
ı	Location		Slope length	Avg. slope
L		3011	(horiz)	steepness. %
	Kentucky\Carlisle Lo	C3 Loring silt loam, 6 to 12 percent slopes, severely	1	
-	County	eroded\Loring silt loam 85%	150	8.0
L		Croded Earling Silk (Calif 007)		

Management	Vegetation	Yield units	Yield (# of units)
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Corn, grain	bushels	140.0
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Wheat, winter south 7in rows	bushels	55.00
CMZ 63\c.Other Local Mgt Records\Spring Hog Manure (Inject+Field Cult 1x) plant MT Corn, No-till Wheat and No-till Soybean Rotation	Soybean, mw 15 - 20 in rows	bu	35.00

Contouring	Diversion or terraces	Subsurface drainage	General yield level	Gallons per Acre Liquid Waste Applied	Estimated lbs /ac dry matter added per acre	KY Phosphorus Index rating Without planned practices
b. absolute row grade 4 percent	None	None	N.A.S.S. Average	6,720 gallons/ac	2,522 lbs	High

Approx Dates +/- 2 weeks	Planned Operation	Description	Estimated Surface. residue (% ground cover) after planned operation, %
4/7	Manure injector, liquid 30 inch rows	6720 gallons/acre	84
4/10	Cultivator, field 6-12 in sweeps		69
4/15	Herbicide pre-emergence		68
4/16	Planter, double disk opnr	Corn, grain	66
5/15	Herbicide post emergence		57
9/20	Harvest, killing crop 20pct standing stubble		93
10/10	Drill or air seeder single disk openers 7-10 in spac.	Wheat, winter south 7in rows	91
3/1	Top Dress Nitrogen (commercial fertilizer)	See AGR-1	79
3/15	Herbicide Application (Wild Gartic)		77
5/15	Fungicide Application (Rust)		61
6/20	Harvest, killing crop 20pct standing stubble		96
6/23	Sprayer, kill crop		95
6/23	Planter, double disk opnr w/fluted coulter, 15 inch row spacing	Soybean, mw 15 - 20	95
7/15	Herbicide - GMO post emergence		93
8/15	Herbicide – GMO post emergence		89
9/15	Herbicide - GMO post emergence		85
11/20	Harvest, killing crop 20pct standing stubble		95



(Continue Page 2 of 2)

Outputs:

Net C factor	Net K factor	T value RMS Level	Soil loss for cons. plan	Soil Loss meets KY ACS (2T+/- 25%))	KY Phosphorus Index rating Wplanned practices	Surface cover % after planting Corn	Surface cover % after planting wheat	Surface cover % after planting beans
0.044	0.53	3.0	6.2	Yes	Medium	66%	91%	95%

FUEL USE EVALUATION:

Fuel type for entire run		
		Fuel cost for entire simulation, US\$/ac
	Land Arrival	II 10 10 10 10 10 10 10
Dissal		
Diocol		000000
Diesel		\$22.20Vec
Diesel		\$33.20/20
Diesel		\$33.20/ac

Soil conditioning index (SCI) +0.26

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

Avg. annual slope STIR 20.0

The STIR value is the Soil Tillage Intensity Rating. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

	and the second										
Farm:		2240				Date	: /	April 9, 200	8		
Tract:	4	016 & 401	7								
				FIELD		RE VALUE I or 8 points	VALUE RATINGS r 8 points)				
		Field #	: 1	Acres:	30	. Field#	:2	Acres:	4.7		
Field Features	Weighted Factor (WF	Existing Value	WF x Existin Value	g I Hanned 9 I Valne	WF x Planned Value	- H. L. Victora	WF.x Existing Value	Planned Value	WF.x Planned Value		
1. Hydrologic Soil Grou	p 1	4	4	4	4	4	4	4	4		
2. Residual Soil Test (F	°) 3	1	3	1	3	1	3	1	3		
3. Field Slope Percent	1	4	4	4	4	2	2	2	2		
Land Cover Percent	es 3	4	12	1	3	∦ 4	12	1	3		
5. Vegetative Buffer Wi	dth 3	8	24	8	24	8	24	8	24		
3. Ag. Impaired Waters	hed 1	1	1	1	1	1	1	1	1		
Application Timing	3	4	12	2	6	4	12	2	6		
3. Application Method	3	8	24	1 1	3	8	24	1	3		
Distance To Waterbo	dy 2	2	4	2	4	2	4	2	4		
0. MLRA Location	1	2	2	2	2	2	2	2	2		
IELD FEATURES INDE	EX	Existing Total*	90	Planned Total	54	Existing Total*	88	Planned Total	52		

Note: If existing total results in a "Low" or "Medium" rating, a nitrogen, or phosphorus based nutrient management plan may be implemented.

5.0	Field Vulnerability for Phosphorus Loss
Total Points from P Index	Generalized Interpretation of P Index
>30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

s Report

Spectrum Analytic Inc. P.O. Box 639 - 1087 Jamison Road Washington C.H., OH 43160

www.spectrumanalytic.com

BARDWELL, KY 42023 AGRI-CHEM 2351 US 51N Report To

STEVE CANNON	Account - AGRI CHEM	Prepared For
 Tested	Sampled	

10-24-2007 10-16-2007

_				 We's reflect annually.	a	U	σ	υ α				00	<u>~~</u>	<u> </u>			
		*		North 9 pitch	BEHIND CABIN-12			BEHIND CABIN-9							_	BEHIND CABIN-1	100
					C02992	C02991	C02990	C02989	C02988	C02987	C02986	C02985	C02984	C02983	C02982	C02981	8116 8116 812 812 812 812 812
					4.7	4.9	4.7	5.3	S)	5.0	5.4	წ.	5	56	6.1	6.0	pu
					6.0	6.2	6.4	6.7	6.7	6.6	6.7	ი დ	б. 8	6.8 8	6.9	7.0	DH
			occ single	1	<u> </u>	1.0	Ņ	ယ်	14	1.2	<u>۔</u> س	1.2	<u>.</u>	<u>-</u>	1.7	1	%
				3	29 N	36 M	181	28 L	29 L	151	13	131	141	17·L	13.	10 L	Ð
	•				128 L	148	108 L	96 L	54 F	42 L	96	69 L	- 66 -		52 L	128 M	×
					595 G	686 G	187 N	276 G	304 M		480	139 N		-	452 G	206 M	Ng .
1		3774				1340	/ 1473 M	1946	2690	1656	2384	1398	1907	2066		/I 2733 H	Ca
					18.1	16.0	- <u>1</u> -2 -8	9.7	17	10.2	11.7	ဂ	ω Ν		9	7.9	
					0.9	<u>.</u>	 N	 ω	0.6	0.5	_	<u>ာ</u>	_		0.7	2.1	×.
					13.7	17.9	တ	<u>-</u>	10.9	11.7	17.1	က ဘ	2	12.5	19.4	10.9	,
		·			19.3					40.7							×.
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								,								cu	Copper
																2 (1997) and (1	малд
																Ä	Alum

Ratings: L=Low M=Medium G=Good H=High V=Very High ows: F: Approx. Bray-P1 lb/A = (M3-P * 0.7) * 2
K: Approx. 1N-NH4OAc lb/A = (M3-K * 0.84) * 2

Mg: Approx. 1N-NH4OAc lb/A = (M3-Mg * 0.88) * 2 Ca: Approx. 1N-NH4OAc lb/A = (M3-Ca * 0.75) * 2

Steve Carrion - Behind Steves Carbin/ Pond Track dividing Time 1/2=19.6 bs /45

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

Client: Steve Cannon

Farm/Tract: T-4016 & 4017

Prepared by: TOMMY L. REDDICK, SCT Date: 3-25-08

1 of 3

ENVIRONMENTAL EVALUATION

KY-NRCS-CPA-52 August 2004

HIMAN		INSTALLED	LIFESPAN	CONSIDERATION		
		(Y/N)	(Y/N)			
		Z	z	Extensive Capital required?		
		Z	z	Extensive Labor required?		
	Economic	z	z	Very high Operation and Management Level required?	ed?	
		Z	z	High:Economic risk involved?		
	Social	Υ	7	Compatible with clients objectives, well being and safety?	afety?	
		Υ	~	Compatible with community well-being & environmental protection?	ental protec	tion?
		Υ	Υ	Environmental Justice Considered during planning?	7	
		Spec	Special Environmental Concerns	ntal Concerns		
≦	L THE PRA	WILL THE PRACTICE/SYSTEM TO BE PLANNED:	O BE PLANNE	D: (Enter Field Numbers for Yes Response)	(N/Y)	FIELDS
	legatively imp	act any prime or u	inique farmland	 Negatively impact any prime or unique farmland or scenic beauty of the area? 	z	
Ŋ	nclude any ea	arth disturbing activ	ities near pipel	Include any earth disturbing activities near pipelines, electrical, or other utilities?	z	
ω	lave a high III	celihood of causing	a public contro	Have a high likelihood of causing a public controversy? (Animal Waste, Burning)	z	
4	Affect any su	spected threatene	d or endangere	Affect any suspected threatened or endangered species, or their habitat? (Indian Bat)	€	1,2
RN	(If adverse	(If adverse effect is indicated, USFWS consultation Ro	l, USFWS cons	(If adverse effect is indicated, USFWS consultation Required)		
Ċ	hange hydro	logy, deposit fill, or	remove stump	Change hydrology, deposit fill, or remove stumps from wetlands (W, FW, FWP) or PCs that	z	
_ CON	If Yes, landowner advisor DOW concerning permit	If Yes, landowner advised of Food Secu DOW concerning permit requirements?	od Security Act	 Fixed book admission of Food Security Act requirements and advised to contact COE & DOW concerning permit requirements? 		
.00	Result in the n	nodification of a str	eam channel, c	Result in the modification of a stream channel, or fill material being placed in any navigable	z	
6a.	If Yes, owner adv	advised to contact	COE & DOW f	If Yes, owner advised to contact COE & DOW for permit requirements?		
.7	Contain any	practices conside	ered as PG or 0	Contain any practices considered as PG or G (CR Matrix, Sect FOTG)?	z	
7a.	(No further a	R review conducted by qualifie (No further action is required)	d individual res	CR review conducted by qualified individual results in "Undertaking Reviewed" (No further action is required)	z	
	CR Review re	CR Review requires field investi (Further action is required)	gation by qualifi	7b: CR Review requires field investigation by qualified archaeologist/SHPO consultation? (Further action is required):	N/A	
30 ico	ocated adjac	Located adjacent to any federally designated wild or scenic river?	y designated w	Located adjacent to any federally designated wild or scenic river?	z	
စ	ocated adiac	ent to any state-de	signated span	Lise waters (Seet 1 ECTO)		
Т		On to only bear of	Subreme about	-conversable of the constraint	2	
10a. 1	Vegatively im If Yes, landov BMPs or pen	Negatively impact riparian vegetal if Yes, landowner advised to cor BMPs or permit requirements?	ation in areas n ntact COE & Do	10. Negatively impact riparian vegetation in areas regulated by Federalistate/local law? 10a. if Yes, landowner advised to contact COE & DOW or other authority concerning EMPs or permit requirements?	z	
111	Result in loss	11. Result in loss of floodplain capacity?	oliy?		ž	
1780	owner advise	That Dwner advised to contact DOW for permit requirements?	for permit requi	rements?		

Signature NRCS Title Title Resource, Economic, and Social Considerations; the S
Title This action and the alternatives on the Resource, Economic, and Social
e Records;X Bott

is categorically excluded from further environmental analysis and there are no extraordinary circumstances. No additional analysis is required.	Environmental Conservation and the secondary countries resource, Eucrounted, and Sound Consulerations, the Special Environmental Conservations and the extraordinary circumstances orter in the instructions for form NRCS-CPA-52. I find, for the reasons stated below, that the selected alternative:
1	<u> </u>

	Rationale supporting the finding	may require preparation of an EA or EIS. The action will be referred to the State Office.	X has been sufficiently analyzed in an existing NRCS environmental document. No additional analysis is required.





Stus Carnor DATE

CERTIFICATION OF:

DISTRICT CONSERVATIONIST

Mark CLAXTON DATE

CONSERVATION DISTRICT

CARLISLE COUNTY DATE

PUBLIC BURDEN STATEMENT

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collections is 0578-0013. The time required to complete this information collection is estimated to average 45/0.75 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection information.

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COMPREHENSIVE NUTRIENT MANAGEMENT PLAN (CNMP)

FOR

STEVE CANNON

APPENDIX D

- NRCS Conservation Practice Standard Nutrient Management, code 590.
- Nutrient Management in Kentucky, University of Kentucky cooperative Extension Service publication, IP-71.
- Taking Soil Test Samples, University of Kentucky cooperative Extension Service publication, AGR-16.
- Sampling Animal Manure, University of Kentucky cooperative Extension Service publication, ID-148.
- Lime and Nutrient Recommendations, University of Kentucky cooperative Extension Service publication, AGR-1

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Acre)

CODE 590

DEFINITION

Managing the amount, sources, placement, form and timing of the application of nutrients and soil amendments.

PURPOSES

- To budget and supply nutrients for plant production.
- To properly utilize manure or organic byproducts as a plant nutrient source.
- To minimize agricultural nonpoint source pollution of surface and ground water resources.
- To maintain or improve the physical, chemical and biological condition of soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied.

CRITERIA

General Criteria Applicable to All Purposes

Plans for nutrient management shall comply with all applicable Federal, state, and local laws and regulations.

Plans for nutrient management shall be developed in accordance with policy requirements of the NRCS General Manual Title 450, Part 401.03 (Technical Guides, Policy and Responsibilities) and Title 190, Part 402 (Ecological Sciences, Nutrient Management, Policy); technical requirements of the NRCS Field Office Technical Guide (FOTG); procedures contained in the National Planning Procedures Handbook (NPPH), and

the NRCS National Agronomy Manual (NAM) Section 503.

Employees of NRCS and other persons who approve plans for nutrient management shall be certified through a certification program acceptable to NRCS in the state of Kentucky. Persons who develop (but not approve) nutrient management plans are not required to become certified. Note: Certification may be required for persons who develop nutrient management plans when regulatory permits or other special rules require technical assistance from a certified nutrient management specialist.

Plans for nutrient management that are elements of a more comprehensive conservation plan or waste management system shall recognize other requirements of the respective plan and be compatible with the other plan requirements.

A nutrient budget for nitrogen, phosphorus, and potassium shall be developed that considers all potential sources of nutrients including, but not limited to animal manure and organic by-products, waste water, commercial fertilizer, crop residues, legume credits, and irrigation water. Note: As crops, method of application, feed ration or consistency of the manure change, it will be necessary to re-calculate an appropriate nutrient application rate using a nutrient budget.

Realistic yield goals shall be established based on soil productivity information, historical yield data, climatic conditions, level of management and/or local research on similar soil, cropping systems, and soil and manure/organic byproducts tests. For new crops or varieties, industry yield recommendations may be used until documented yield information is available.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

NRCS, KY, 05/24/01

Individual nutrient recommendations will be formulated on a philosophy that considers University of Kentucky Lime and Fertilizer recommendations or crop nutrient removal potential. Estimated crop nutrient removal values (nutrients removed in harvested plant biomass) approved by NRCS for several key crops grown in Kentucky can be referenced in Appendix A, Table 6 of this standard.

Excess nutrients shall not be applied in situations in which it causes unacceptable nutrient imbalances in crops or forages.

Nitrogen (N), Phosphorus (P) and Potassium (K) - The planned rates of nutrient application, as documented in the nutrient budget, shall match the recommended rates as closely as possible for all nutrients including nitrogen, phosphorus and potassium. More information about nutrient availability from certain sources, storage/application losses, and removal values can be referenced in Appendix A, Tables 1-6 of this standard.

Note: The following information applies to all applied nutrients such as from commercial (mineral based) fertilizers, animal wastes and other sources:

When the soil test results indicate a level of phosphorus that is 400 lbs/acre or less, the University of Kentucky Lime and Fertilizer recommendations or NRCS approved estimated crop removal values will be used to determine application rates based on nitrogen as the limiting nutrient.

When the plan is being implemented on a nitrogen basis, manure or other organic byproducts shall be applied at rates that are limited by the amount of nitrogen in the material. Credit for available nitrogen provided from cover crops and previous crop residues shall be considered in the nutrient budget. Refer to Appendix A, Table 4 (Estimated Nitrogen Availability To Succeeding Crops From Legumes) for related information.

In certain cropping situations such as involving soybeans, alfalfa and other legumes, nitrogen application may not be recommended according to the University of Kentucky Lime and Fertilizer recommendations. In these situations, manure or other organic by-products (containing nitrogen) may be applied at rates

not to exceed the estimated removal of nitrogen in harvested plant biomass.

Estimated crop nutrient removal values approved by NRCS are referenced in Appendix A, Table 6

When the soil test results indicate a level of phosphorus above 400 lbs/acre, nutrient application rates will be determined by using one of the following options: Phosphorus Threshold (PT) or Phosphorus Index (PI).

Option 1 - Soil Test Phosphorus Threshold (PT) Values. In situations where the soil test phosphorus (STP) levels are below 400 lbs/acre, nitrogen based nutrient applications may be applied. As soil test levels increase above 400 lbs/acre, planned phosphorus application rates (from any nutrient source) shall be determined as based on estimated phosphorus removal in harvested plant biomass at levels prescribed in the phosphorus threshold. When soil test phosphorus exceeds 1066 lbs/acre no further applications of phosphorus (from any nutrient source) shall be made to the field/area.

When the Phosphorus Threshold option is utilized, the following information applies:

401-800 STP - Phosphorus applications at rates not to exceed the estimated removal of phosphorus in the harvested plant biomass.

801-1066 STP - Phosphorus applications at rates not to exceed 1/2 of the estimated removal of phosphorus in the harvested plant biomass.

(Reference the *Phosphorus Threshold for Kentucky in Appendix C (P Matrix,Option 1)* of this standard for more information.)

Option 2 - Phosphorus Index (PI) Rating.

Low or Medium Risk Sites - Nitrogen based nutrient application.

High and Very High Risk Sites - Phosphorus based or no nutrient application.

In some instances the (PI) rating may be in the low or medium risk category when soil test phosphorus is above 400 lbs/acre. In these instances, nutrient application rates based on nitrogen may be planned. University of Kentucky Lime and Fertilizer feet from streams, sinkholes and other sensitive areas is recommended. Additional federal, state and local guidelines may apply to application setbacks.

- Liquid (animal manure) waste applications shall not be applied on frozen soils. Liquid applications may be land applied in fields/areas within 30 days of the beginning of crop growth when soil conditions are favorable unless heavy precipitation is forecasted before the liquid can be absorbed into the soil profile.
- These exceptions will only apply if Best Management Practices (BMP's) are applied such as filter strips, crop residue management, vegetative cover management, application set backs and other strategies are implemented properly so as to reduce the risk of pollution.

Nutrient Application Methods

Nutrient applications associated with irrigation systems shall be applied in accordance with the requirements of Irrigation Water Management (Code 449).

Additional Criteria Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source

Animal manure applications are primarily based on plant available nutrient content. However, the volume applied (tons, gallons, cubic feet, acre-inches) on a per acre basis during each application event and the soil conditions at the time of application are also of concern. For these reasons a sound nutrient management plan must contain strategies for application that consider manure nutrient values, volume applied during each application and other site specific limitations.

Nutrient Analysis/Testing

Nutrient values of manure and organic byproducts (excluding sewage and bio-solids) shall be determined (by laboratory analysis) prior to land application.

Exception: When preparing nutrient management plans on "new" animal feeding operations, (those without manure in storage), approved "book values" for estimated manure

nutrient content may be used as a basis for planning application rates until a manure analysis can be obtained. Approved "book values" are those recognized by the NRCS and the University. Approved book values for animal manures recognized by NRCS and the University can be referenced in Appendix A, Tables 1,2,3,5 of this standard.

When an analysis of the manure is available, an application amount can be determined using known nutrient values at the time of application. Testing of the manure shall include an analysis for total nitrogen and total phosphorus. The analysis results can be converted to pounds of nutrients per ton for solids and/or pounds of nutrients per 1000 gallons for liquids. Note: Once historical laboratory manure analysis data is established, annual analysis is not required unless operational changes occur with manure storage facilities, storage intervals, feed rations and other situations.

Recommended procedures for collecting and preparing manure samples can be referenced in *Appendix B* of this standard.

Manure Nutrients: Application Rate Limitations

The application rate (in/hr) for material applied through irrigation shall not exceed the soil intake/infiltration rate. The total application shall not exceed the field capacity of the soil.

The planned rates of manure or organic byproducts applied as a source of plant available nitrogen and phosphorus shall be determined based on guidance as outlined in following sections. More information about manure nutrient application rates can be referenced in Chapter 3 of the NRCS Agricultural Waste Management Field Handbook.

Estimated crop nutrient removal values approved by NRCS can be referenced in Appendix A, Table 6 of this standard.

Manure Volume - Expected Land Application Rates of Manure Based on Volume Limitations

The plant available nutrient amounts in manure can vary due to time in storage, storage methods, ration content and other reasons.

- avoiding winter nutrient application for spring seeded crops unless nutrient availability to the crops can be timed with subsequent emergence and growth,
- band applications of phosphorus near the seed row,
- applying nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques, and/or
- immediate incorporation of land applied manures or organic by-products,
- delaying field application of animal manures or other organic by-products if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Consider minimum application setback distances from environmentally sensitive areas, such as sinkholes, wells, gullies, ditches, surface inlets or rapidly permeable soil areas.

Consider the potential problems from odors associated with the land application of animal manures, especially when applied near or upwind of residences.

Consider nitrogen volatilization losses associated with the land application of animal manures. Volatilization losses can become significant if manure is not immediately incorporated into the soil after application.

Consider the potential to affect listed or eligible cultural resources in the State or National Register.

Consider using soil test information no older than one year when developing new plans, particularly if animal manures are to be a nutrient source.

Consider annual reviews to determine if changes in the nutrient budget are desirable (or needed) for the next planned crop.

On sites on which there are special environmental concerns, consider other sampling techniques. (For example: Soil profile sampling for nitrogen, Pre-Sidedress Nitrogen Test (PSNT), Pre-Plant Soil Nitrate Test (PPSN) or soil surface sampling for phosphorus accumulation or pH changes.)

Consider ways to modify the chemistry of animal manure, including modification of the animal's diet to reduce the manure nutrient content and to enhance the producer's ability to manage manure effectively.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s), using nutrients to achieve production goals and to prevent or minimize water quality impairment.

The following components shall be included in the nutrient management plan:

- aerial photograph or map and a soil map of the site,
- current and/or planned plant production sequence or crop rotation,
- results of soil, plant, water, manure or organic by-product sample analyses,
- realistic yield goals for the crops in the rotation,
- quantification of all nutrient sources,
- recommended nutrient rates, timing, form, and method of application and incorporation,
- location of designated sensitive areas or resources and the associated, nutrient management restriction,
- guidance for implementation, operation, maintenance, record keeping, and
- complete nutrient budget for nitrogen, phosphorus, and potassium for the rotation or crop sequence.

If increases in soil phosphorus levels are expected, plans shall document:

- the soil phosphorus levels at which it may be desirable to convert to phosphorus based implementation,
- the relationship between soil phosphorus levels and potential for phosphorus transport from the field, and
- the potential for soil phosphorus drawdown from the production and harvesting of crops.

Bahman, E., Gilley, J., Kramer, L. A., Moorman, T.B., 1998. Grass Hedge Effects on The Transport of Phosphorus, Nitrogen and Sediment Following Field Application of Beef Cattle Feedlot Manure. Manure Mgt. in Harmony with the Environment and Society, Soil and Water Conservation Society. Ames IA

Grigar, J., Lemunyon, J. L., 1998. A Procedure for Determining the Land Available for Winter Spreading of Manure in Michigan, NRCS, East Lansing, Michigan.

Lemunyon, J. L., and R.G. Gilbert, 1993. The Concept and Need for a Phosphorus Assessment Tool. J. Prod. Agriculture no.6: 483-486.McFarland, A. and L. Hauck. 1997. Livestock and the Environment: A National Pilot Project - NPP Report on the Stream Water Quality in the Upper North Bosque River Watershed. (PR97-03) Texas Institute for Applied Science.

Moore, P.A., Jr., 1999. Development of a Phosphorus Index for Pastures, Southern Soil Fertility Conference, Memphis, TN.

Sharpley, A., 1995, RCA III Fate and Transport of Nutrients Phosphorus, A working paper number 8, NRCS & USDA, ARS National Ag Water Quality Lab. Durant OK.

Sims, J. T., 1994. The Phosphorus Index: A phosphorus management strategy for Delaware's agricultural soils, Department of Plant and Soil Sciences, Newark DE.

Talarczyk, K. A., 1998. Timing of Manure Applications to Cropland to Maximize Nutrient Value. Manure Management in Harmony with the Environment and Society, Soil and Water Conservation Society. Ames IA.

USDA-Natural Resources Conservation Service, National Engineering Handbook, Agricultural Waste Management Field Handbook, Part 651, 1992

Lime and Fertilizer Recommendations, (AGR-1), University of Kentucky, Lexington, Kentucky.

Wells, K. L., Thomas, G.W., Sims, J.L., Smith, M.S., 1991. Managing Soil Nitrates For Agronomic Efficiency and Environmental Protection. (AGR-147) University of Kentucky, Lexington, Kentucky.

Assessment of the Potential for Livestock and Poultry Manure to Provide the Nutrients Removed By Crops and Forages in Kentucky. (IP-56) 1999 University of Kentucky, Lexington, Kentucky.

Potential for Livestock and Poultry Manure to Provide the Nutrients Removed By Crops and Forages in Kentucky. (IP-57) 1999 University of Kentucky, Lexington, Kentucky.

Rasnake, M., Thom, W.O., Sikora, F. "Using Animal Manures As Nutrient Sources" (AGR-146) Revised 2000 University of Kentucky, Lexington, Kentucky.

Henning, J., Lacefield, G., Rasnake, M., Burris, R., Johns, J., Johnson, K., Turner, L. "
Rotational Grazing" (ID-143) 2000 University of Kentucky, Lexington, Kentucky.

Reid, R. L., G. A. Jung, and D. W. Allinson, 1988. "Nutritive Quality of Warm Season Grasses in the Northeast". Bulletin 699, West Virginia University, College of Agriculture and Forestry.

Jung, G. A., Schaffer, J. A., Stout, W. L., "Switchgrass and Big Bluestem Responses To Amendments on Strongly Acid Soils". Agronomy Journal 80:669-676.

APPENDIX A

Table 1 - Manure and Nutrients As Excreted Per 1000-lb. Live Weight/Day

Animal Type	Volume of Manure (cu.ft.)	Dry Matter Manure (lbs)	Total Nitrogen (lbs)	Total P as P₂O₅ (lbs)	Total K as K₂O (lbs)
Beef (all cattle and calves) 2/	1.00	8.5	.34	.21	.25
Dairy Cows 2/	1.32	12.0	.45	.21	.35
Dairy Heifers ^{2/}	1.30	12.0	.45	.21	.35
Swine - Lactating Sows w/litters ^{2/}	.96	11.0	.52	.41	.35
Swine – Gestating Sows, Boars, Gilts 2/	.50	5.5	.26	.20	.17
Swine – Nursery and Finishing Pigs ²	1.70	11.0	.52	.41	.35
Poultry Litter - Layer ^{2/}	.93	16.0	.84	.69	.36
Poultry Litter - Breeder Layer ²⁷	.93	16.0	,84	.69	.36
Poultry Litter - Pullet 3/	.73	11.4	.62	.55	.31
Poultry Litter - Breeder Pullet 3/	.73	11.4	.62	.55	.31
Poultry Litter - Broiler 2/	1.26	22.0	1,10	.69	.48
Horses 3/	.80	11.0	.28	.11	.23
Sheep and Lambs 3/	.62	10.0	.45	.16	.36

^{1/} Poultry litter weighs about 27 lbs/cu ft (considering bedding). Swine, dairy, beef , horses and sheep waste (solids) weighs about 60 lbs/cu ft. Liquids weigh about 62.4 lbs/cu ft.

² Adapted from 1993 ASAE Standards. Reference: University of Kentucky (IP-57) Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky, Issued 9-1999

³⁹ Adapted from 1992 NRCS Agricultural Waste Management Field Handbook.

APPENDIX A

Table 3 - Percent of Nutrients from Manure Available to a Crop During the Year of Application in Comparison with Fertilizer Nutrients

(Based On Application Conditions) 1/

Nutrient	Availability Coefficient		
	Poultry or Liquid	Other Manures	
trogen			
Corn & Others: Corn, Tobacco, Annual Gra	sses or Sorghum		
Spring Applied			
Incorporation: 2 days or less	0.60	0.50	
Incorporation: 3-4 days	0.55	0.45	
Incorporation: 5-6 days	0.50	0.40	
Incorporation: 7 days or more	0.45	0.35	
Fall Applied			
w/o cover crop	0.15	0.20	
W/ cover crop	0.50	0.40	
Small Grains (pre-plant)	0.50	0.40	
Pasture (Fall or early Spring)	0.80	0.60	
osphate	0.80	0.80	
tash	1.00	1.00	

 $^{^{}y}$ Note: Information from Table 2 or from a laboratory analysis will be used as a basis for Table 3.

Table 3 Source: AGR-146 "Using Animal Manures as Nutrient Sources" 8/2000 University of KY.

APPENDIX A

Table 6 - Crop Nutrient Removal Values*

	Nutrients Removed (Ibs/yield unit)				
Crop	Yield Unit	Lbs per Yield Unit	Total Kjeldahl Nitrogen	P ₂ O ₅	K₂O
Alfalfa hay ^{1/}	Ton	2000	50.00	14.000	55
All other cool season grass/legume hay (except alfalfa) ^{1/2}	Ton	2000	35.00	12.000	53
Rye for grain ²	Bushel	56	1.16	.330	.32
Oats for grain ^{2/}	Bushel	32	.62	.250	.19
Barley for grain ²	Bushel	48	0.90	0.410	0.30
Com for grain ^y	Bushel	56	0.70	0.400	0.35
Corn for silage or green chop ^{1/}	Ton	2000	7.50	3.600	8.0
Winter wheat for grain ^{1/2}	Bushel	60	1.20	0.500	0.30
Sorghum for grain ^{1/}	Bushel	56	0.95	0.410	0.30
Soybean for beans ^{1/}	Bushel	60	3.00	0.700	1.10
Tobacco, burley ^y	Pound	1	0.07	0.011	0.075
Tobacco, dark air-cured ^y	Pound	1	0.07	0.006	0.06
Tobacco, dark fire-cured ^{1/}	Pound	1	0.07	0.006	0.06
Forage from pastureland ^{3/}	Ton	2000			
Big Bluestem, Indiangrass, Little Bluestem, Switchgrass ⁴ hay	Ton	2000	20.00	6.800	25
Bermudagrass ⁴ hay	Ton	2000	37.60	8.700	33.6
Reed Canary Grass ^{4/} hay	Ton	2000	27.00	8.200	25

APPENDIX B

MANURE SAMPLING PROCEDURES

For laboratory testing, manure can be handled as a solid, semi-solid, or liquid. Semi-solid manure usually requires thorough agitation before pumping and sampling.

When to Sample

Sample manure as close to the time of land application as possible. Sampling at the time of application will not provide manure recommendations that can be used to adjust the amount of manure applied. However, the results can be used to adjust the amount of inorganic fertilizer applied and can also be used at the next application event. If you apply manure several times a year, sample when you apply the bulk of the manure. Ideally, manure sampling should be done in the field as manure is applied. This ensures that losses that occur during handling, storage, and application are taken into account.

Manure Sampling in the Field

Dry or Solid Field Sampling. To sample manure from barns, holding areas, dry stacks, or feed lots, collect a sample as follows:

Use the "hand and bag" method to collect all solid manure samples. Place a one-gallon re-sealable freezer bag turned inside out over one hand. Grab a handful of manure with covered hand and turn the freezer bag right side out over the sample with the free hand. Seal the bag and place it in another freezer bag to prevent leaks. Label the bag and send to the lab or freeze it immediately to prevent nutrient losses. Take three samples for dry or solid manure. Combine the samples and mix. Place in ziplock bag.

Liquid Manure Sampling

When sampling liquid manure agitate the manure in the storage facility to obtain a representative sample for laboratory analysis.

Liquid Manure Applied with Spreaders

- Immediately after filling the tank spreader, use a clean plastic bucket to collect manure from the unloading port or the opening near the bottom of the tank. Be sure the opening does not have solids accumulated that can contaminate the samples.
- Stir the manure in the pail and immediately fill a one-quart flexible plastic bottle about 25 percent full. Do not use a glass bottle as it might explode from pressure build-up. Squeeze as much air out of the bottle as possible before capping.
- 3. Put your name, date and sample number on the bottle and the information sheet.
- 4. If the sample cannot be sent to the laboratory within a few hours, it should be refrigerated. Place the sample in a plastic bag, seal the bag, and keep cool until it is sent to the laboratory. Ship so that the sample arrives promptly at the laboratory.

Samples should be shipped express mail to the lab the same day they are collected. If not, they should be refrigerated immediately. It is advisable to keep samples on ice even during shipment to the laboratory.

APPENDIX B

LITTER SAMPLING PROCEDURES

All litter is not managed the same way. Nutrient content can vary considerably. Every poultry producer should have his or her litter analyzed for nutrient content. If the litter is fed to cattle, an analysis is critical. Litter is fed to cattle for crude protein and ash content. Litter with a crude protein content of 28 percent and an ash content less than 15 percent is ideal for feeding. Since calcium, phosphorus, potassium and trace minerals make up about 12 percent of the ash content, anything above that amount is probably soil. Since soil is worthless for feed, care must be taken when removing litter from the houses.

Sample Collection

General Sampling. Several small samples should be collected in clean 5 gallon buckets. Mix the contents of the 5 gallon buckets for a composite sample. Place a one-gallon resealable freezer bag turned inside out over one hand. Grab a handful of manure with covered hand and turn the freezer bag right side out over the sample with the free hand. Seal the bag and place it in another freezer bag to prevent leaks. Label the bag and send to the lab or freeze it immediately to prevent nutrient losses. Label the bags with permanent marker as follows:

- 1. Name
- 2. Address
- 2. Address
- Type of chicken
- 4. Number of flocks representing the sample
- 5. House number

Method of sampling (in-house, from stack, during loading, in-field)

As a precautionary measure include the same information on a 3 by 5 card and place inside the outside freezer bag.

Other Methods of Sampling

In-House. Ten to 15 samples are collected throughout the house before cleanout. Three to four samples should be collected under or near the waterers and the rest collected throughout the remainder of the house. Dig only as deeply

as you plan to scrape. Be careful not to include any soil in the sample. This method of sampling will allow reports back before land application so that an appropriate land application amount can be determined. This method is labor intensive.

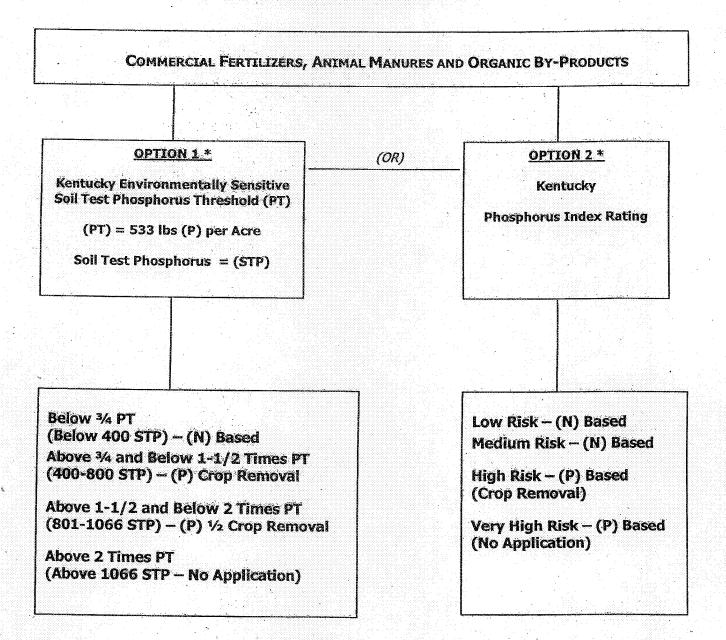
During cleanout. Samples are collected as litter is loaded onto the spreader or as it is temporarily stockpiled prior to spreading. Individual samples should be collected throughout the cleanout. This method of sampling will not allow time for lab results return before land application occurs. This method will reflect an analysis of what is actually scraped out of the houses.

During spreading. A plastic sheet or gallon plastic jugs cut in half are placed in the field to collect litter as it is spread. This method is most accurate. This method will not allow time for lab results to be returned in time. However, results can be used the following application event.

Stockpile. Litter stored for a period of time is subject to heat and this can change its chemical characteristics. Since temperatures will peak in 10 to 20 days after initial stacking, samples should be collected after the temperature drops and as close to spreading or feedings time as

NRCS, KY, 05/24/01

KENTUCKY PHOSPHORUS (P) MATRIX



*Note: A nitrogen (N) based plan can be implemented when STP is below 400. When STP is equal to or greater than 400, the use of either Option 1 or Option 2 is required in all cases.

Also assigned to each of the ten features are value ratings of LOW (1 point), MEDIUM (2 points), HIGH (4 points), or VERY HIGH (8 points). Multiplying the weighted factor by the appropriate value rating yields points for that specific field feature. Based on a summation of the field feature points, the field falls into an overall category rating of LOW, MEDIUM, HIGH, or VERY HIGH. If a field receives an overall rating of HIGH or VERY HIGH, management practices may be implemented to reduce the rating to MEDIUM.

		al section
	Field Features	Weight
1. Hydr	ologic Soil Group	Facto 1
2. Resid	lual Soil Test (P) Level	3
3. Field	Slope Percent	1
4. Land	Cover Percent	3
5. Vege	tative Buffer Width	3
6. Agric	ultural Impaired Watershed	1
7. Applic	ation Timing	3
8. Applic	ation Method	3
9. Distar	nce To Spring/Stream/Waterbody	2
10. MLRA	(County Location)	1 7

Currently, these weighted factors are based on the professional judgment of the various technical specialists who contributed to the development of the NRCS standard (590). As more research becomes available, the P Index will be periodically reviewed and updated.

Description of Field Features and Rating Assignments

1. Hydrologic Soil Group (HSG) considers the drainability of the soil. A soil with a HSG of "A" is well drained. A soil with a HSG of "D" is poorly drained. A soil that is poorly drained is more likely to have runoff occur. HSG is given a weighted factor of 1.

- Residual Soil Test (P) considers the level of (P) in the soil prior to the application of nutrients. This level is determined by a current soil test analysis. A current soil test analysis is less than 1 year old. As soil test levels increase following repeated applications, the index points will need to be recalculated. Soil test (P) is given a weighed factor of 3.
- Field Slope Percent considers the average percent of slope for the field. Field slope is given a low weighted factor of 1 because it is considered in the Erosion Rate.
- 4. Land Cover Percent considers the percent ground cover (average over the field) immediately following the waste application. The waste application may be surface applied, injected or incorporated. Ground cover is considered to be perennial sod or crop stubble that is evenly spread over the soil surface of the application field/s. Perennial sod shall have a minimum of 3-4 inches of plant height. Land cover is given a low weighted factor of 3 because it is also considered in the application of erosion control practices.
- 5. Vegetative Buffer Width considers the filtering effect of vegetative buffers at downstream edges of fields. Filtering effect must be from sheet flow across the buffer. Filter strips, field borders, contour buffer strips, and riparian forest buffers are all examples of vegetative buffers. Due to the vast amount of favorable research that reinforces the effectiveness of buffers, this feature is given a weighted factor of 3.
- Application Area is in a Watershed Identified as Being Impaired Due to Agricultural Applied Nutrients. These areas are identified on state supplied listings. If the application fields are in the watershed as identified on the list currently on file in NRCS offices, a weighted factor of 1 is assigned.

Kentucky Phosphorus Index Multiplying the weighted factor by the war				
The second secon		aung yierds points and mar specine field reature.		
rfield Features (weghted factors in parenties); pelow)	Low (1 point)	Medium. (2 points)	: High 4 points)	Very High
1. Hydrologic Soil Group (1.0)	А	В	°C ,	Ď.
2. Residual Soil Test (P) Level (3.0)	Between 400-500	Between 501-800	Between 801-1066	Above 1066*
Field Slope Percent (1.0)	<2	2-5	6-12	>12
Land Cover Percent* (3.0) *estimated after application	60-90	30-60	15-30	0-15
5. Vegetative Buffer Width (3.0) (ft)	>29	20-29	10-19	<10 or No Buffer
Application Area Is In A Watershed Identified As Being Impaired Due To Agricultural Applied Nutrients (1.0)	NO			YES
7. Application Timing (3.0)	June - Sept	April, May, Oct., March or Nov. w/ winter cover	March or Nov. w/o winter cover, Feb. w/ winter cover	Dec., Jan., Feb.
8. Application Method (3.0)	Injected	Surface applied and incorporated within 48 hr.	Surface applied and incorporated within 1 month	Surface applied and unincorporated fo greater than 1 month
Downstream Distance From Application Area To Spring, Stream or Waterbody (2.0)	Over 150	50-150	0-50	Adjacent
MLRA (County Location) (1.0)	Bluegrass	All Other	The second secon	All Comments

Note: Additional Phosphorus Will Not be Applied When Soil Test (P) Level is above 1066.

Toell Points: Rom Palmex;	Generalized Interpretation of Paindex (1975) 1975
< 30	LOW potential for P movement from the field. Low probability of an adverse impact to waterbodies.
30 - 60	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting into waterbodies exists. Buffers, setbacks, lower manure rates, cover crops, crop residue practices alone or in combination may reduce impact.
61 - 112	HIGH potential for P movement from the field. The chance of organic material and nutrients getting to waterbodies is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact.
> 112	VERY HIGH potential for P movement from the field and an adverse impact on waterbodies.

REFERENCES

Bahman, E., Gilley, J., Kramer, L. A., Moorman, T.B., 1998. *Grass Hedge Effects on The Transport of Phosphorus, Nitrogen and Sediment Following Field Application of Beef Cattle Feedlot Manure.* Manure Mgt. in Harmony with the Environment and Society, Soil and Water Conservation Society. Ames IA

Grigar, J., Lemunyon, J. L., 1998. A Procedure for Determining the Land Available for Winter Spreading of Manure in Michigan, NRCS, East Lansing, Michigan.

Lemunyon, J. L., and R.G. Gilbert, 1993. The Concept and Need for a Phosphorus Assessment Tool. J. Prod. Agriculture no.6: 483-486.

McFarland, A. and L. Hauck. 1997. Livestock and the Environment: A National Pilot Project - NPP Report on the Stream Water Quality in the Upper North Bosque River Watershed. (PR97-03) Texas Institute for Applied Science.

Moore, P.A., Jr., 1999. Development of a Phosphours Index for Pastures, Southern Soil Fertility Conference, Memphis, TN.

Sharpley, A., 1995, RCA III Fate and Transport of Nutrients Phosphorus, A working paper number 8, NRCS & USDA, ARS National Ag Water Quality Lab. Durant OK.

Sims, J. T., 1994. The *Phosphorus Index: A phosphorus management strategy for Delaware's agricultural soils*, Department of Plant and Soil Sciences, Newark DE.

Talarczyk, K. A., 1998. Timing of Manure Applications to Cropland to Maximize Nutrient Value. Manure Management in Harmony with the Environment and Society, Soil and Water Conservation Society. Ames IA.

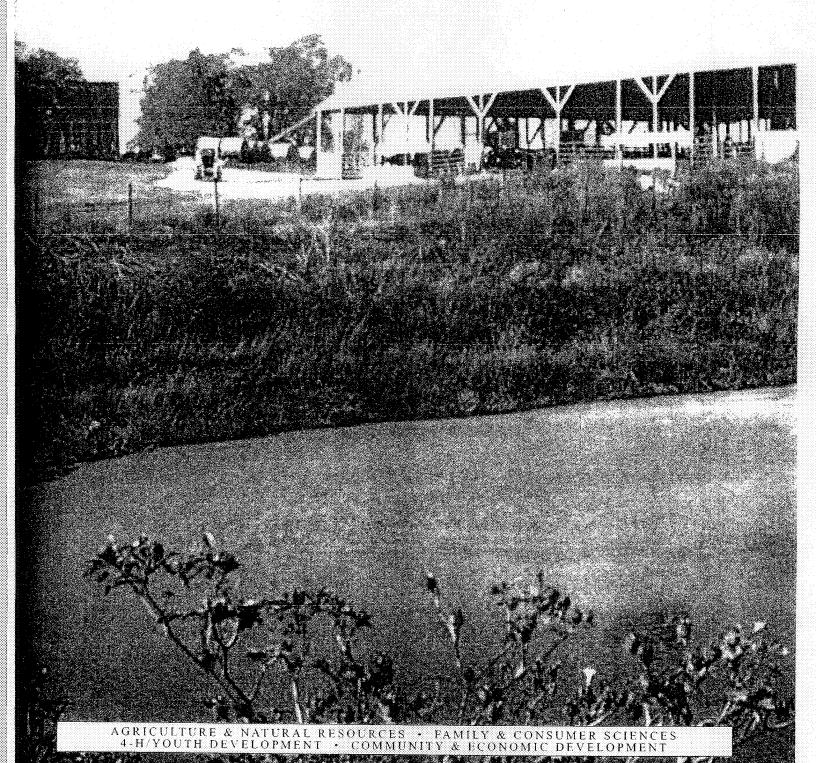


COOPERATIVE EXTENSION SERVICE

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Nutrient Management in Kentucky

Nutrient Management Focus Group, Environmental and Natural Resource Issues Task Force



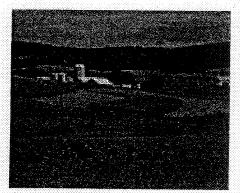


Photo courtesy of USDA NRCS.

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Nutrient Management in Kentucky

Nutrient Management Focus Group, Environmental and Natural Resource Issues Task Force

Implementing a nutrient management plan can save on fertilizer costs while protecting water quality. The objective of nutrient management is to use nutrients (mainly nitrogen, phosphorus, and potassium) wisely for optimal economic benefit to the farmer while minimizing impact on the environment. Nutrients are essential for the growth of crops and must be supplied to plants in adequate amounts to achieve satisfactory yields and profits. Excessive application of fertilizers or manure can contribute to pollution of streams and groundwater resources and generally reduce profitability. A properly implemented nutrient management plan can assure the farmer that the correct amounts of nutrients are being utilized in the most efficient manner.

Nutrients on a farm can be cycled, accumulated, or passed through. They can come onto a farm in the form of feed, commercial fertilizers, manure, or compost. Nutrients leave the farm through harvested crops, livestock sold, or manure moved off the farm, or they can be lost through the air or water. Some crops have the ability to fix nitrogen from the atmosphere and thereby contribute to the nutrient content of the soil. Grazing animals cycle nutrients in pasture systems by consuming forage and then depositing nutrients back to the land in the form of manure and urine.

As a nutrient plan is developed, the long-term balance of soil fertility, plant uptake, and removal of nutrients and the potential loss of nutrients to the environment should be considered. An appropriate goal for the nutrient plan is to maintain a productive, fertile farm. A trend that indicates a decrease in the nutrient status of the farm means there will be a need to add nutrients in the future. A trend that suggests a continuing buildup of nutrients indicates a supply in excess of plant needs and will likely require a change in management to improve farm profitability and avoid potential environmental harm.

This publication will look at these trends and other factors that must be considered when developing a nutrient management plan. Carefully planning how nutrients are managed will help protect the long-term sustainability and profitability of the farm.



Nutrient Sources

Livestock Manure

The nutrient content of animal waste is quite varied and often specific to animal type. Manure quality depends on the nutritional quality of the animals' feed, handling of the manure, and storage conditions.

Commercial Fertilizers

Plant nutrients are often supplied to agricultural systems in the form of chemical fertilizers. Nitrogen, phosphorus, and potassium are the three primary nutrients added to cropping systems, although many other nutrients may be used to promote plant growth and development. When commercial fertilizers are applied at rates that exceed the plants' ability to remove the nutrients at a given growth stage, fertilizer runoff can occur. This runoff may be harmful to nearby water resources and is a waste of fertilizer.

Crop Residues

Crop residues contain valuable nutrients that can be left in the field to build soil organic matter. Crop residues decompose to provide nutrients over time. This slower release of plant nutrients reduces the risk of nutrient runoff.

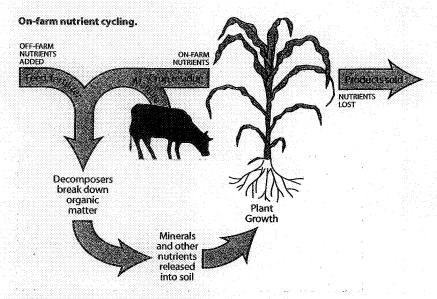
Soil Mineral Weathering

The weathering of minerals (rocks) in the soil can be a source of nutrients, especially

What Is a Nutrient Management Plan?

A nutrient management plan is an accounting of all nutrients present on the farm as well as all of the nutrients coming onto the farm in the form of commercial fertilizers or manure. The plan balances these nutrients with the amount of nutrients required for crop growth. Components of a nutrient management plan include:

- · Soil maps with field designations.
- Crop plan.
- Conservation practices plan.
- Manure collection and storage facilities.
- · Manure nutrient content.
- Manure utilization plan.
- Records, including soil tests, fertilizer recommendations, manure applications, and yield estimates.



Adapted from: Natural Nutrient Cycle—1998 Project Food, Land, and People; Farm Nutrient Cycle—Douglas Beegle, The Pennsylvania State University

phosphorus and potassium. This is particularly of interest in the Bluegrass region of Kentucky, where phosphorus is naturally present in high concentrations in the soil.

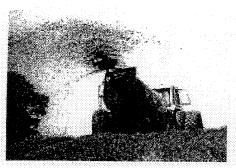
Atmosphere

Some plants, such as legumes, maintain symbiotic relationships with bacteria that can fix atmospheric nitrogen. Fixed nitrogen is available for the host plant and sometimes non-fixing plants grown in association with nitrogen-fixing plants. However, plants will preferentially uptake mineral forms of nitrogen when available, such as from chemical fertilizers.

A covered structure provides manure storage until the appropriate application time.



A lined earthen basin is an appropriate storage structure for liquid manure.



Liquid manure applications may be applied within 30 days of the beginning of crop growth unless heavy precipitation is forecast before the liquid could be absorbed into the soil profile.



Apply animal manure when the crop can best use the nutrients it supplies.

Manure Storage Systems

A storage facility in an animal manure management system allows a producer control over the timing and scheduling of land application when:

- It does not interfere with other farm work.
- Field conditions are not too wet or frozen.
- Favorable weather conditions may reduce off-farm odor complaints.

The storage capacity should be based on these considerations. In Kentucky, a minimum storage capacity of 120 days is recommended to store the manure through the winter months when field conditions are often poor for application. In general, 12-month storage capacity for liquid manure systems gives the optimal flexibility for the situations cited above. If storage capacity is too small, the facility will fill before the manure nutrients can be used in an environmentally sound manner.

A manure storage system can be:

- · A covered stack pad for solid manure with leachate collection.
- An above- or below-ground tank for liquid manure.
- A lined earthen basin to store or treat large volumes of liquid manure.

Selecting the most appropriate storage system depends on available capital and labor, manure sources, animal production system, soil type, cropping practices, topography, neighbors, convenience, aesthetics, and regulations. All storage systems are balances and compromises among these competing priorities. Economics and environmental regulations are key considerations when choosing a manure storage system.

Other items to consider are the amount and type of land available for application, fresh water resources, and required odor control measures. The manure storage system selected should not be based solely on available equipment and facilities. All items should be considered to avoid costs associated with inefficient manure handling.

Stored manure nutrients can be applied to the land by:

- Surface application with a box or tank spreader wagon, followed by a light tillage operation to increase nitrogen retention and reduce odors.
- Liquid injection from tank wagons.
- Irrigation with an option to incorporate the nutrients into the soil.
- Towed hose, continuous injections with tractor-mounted tool bars.

Irrigation reduces soil compaction and increases time available for manure application since post-planting application can occur. Land application can be performed by custom applicators. It reduces capital expenses and labor, but timeliness of application could be limited by the availability of an operator. Irrigation has the drawback of increased odor production.

Planning Manure Applications for Crop Production

Step 1. Soil Testing

Planning should start with taking a representative soil sample from the field and having it tested to determine the current fertility status. Soil pH, phosphorus, and potassium are the primary factors to consider. Other nutrients, such as calcium, magnesium, and organic matter, could be useful also, especially for long-term comparisons. Testing should be done by the University of Kentucky Soil Testing Laboratory. Other laboratories may be used if they have the same procedures as the University of Kentucky Soil Testing Lab. Extension publication AGR-1, *Lime and Fertilizer Recommendations*, lists the testing method used to develop soil test recommendations in Kentucky.

County Extension offices can provide information on how to take soil samples. They can also provide sample containers, record forms, and, in some cases, soil probes for taking samples. They will arrange to have samples tested and provide fertilizer recommendations based on the results. Soil samples should be taken well ahead of the time that manure applications are planned. It will take several weeks to get samples taken, have them tested, and determine fertilizer recommendations. If spring applications of manure are planned, it is a good idea to take samples in the fall. Likewise, soil samples taken in the spring will give time to plan manure applications for fall.

A good soil test is the only way to be sure enough nutrients are available for crop needs and to prevent the levels of some nutrients from becoming high enough to threaten water quality.

Step 2. Manure Testing

Although average "book values" of the nutrient content of manures can be used for short-term planning of manure application rates, farmers need to determine more accurate values for the manure they will be using in order to develop good long-term plans. This means that manure samples should be taken as soon as possible in the planning process to get a representative sample. In the case of broiler litter to be applied as soon as it is removed from the house, samples can be taken in the house between the last two flocks raised just prior to cleanout. However, if the litter is to be stacked for some time before it is to be applied, samples should not be taken until a few weeks before it is to be applied because nutrient content changes during storage.



Soil testing is the foundation of a sound nutrient management program.



Sample manure as close to the time of land application as possible.

Varying Nutrient Needs

Some examples of varying nutrient needs based on the factors mentioned are:

Crop—Corn and soybeans have very different needs. Corn must have nitrogen supplied, while soybeans obtain their own through nitrogen fixation.

Yield—A 200-bushel per acre corn crop requires much higher fertility than a 100-bushel corn crop.

Soil type—The predominant soil type in a field affects yield potential and the availability of nutrients to crops. Soil characteristics such as depth, drainage, and ability to supply moisture are important.

Previous crop—Some crops, especially sod crops, build up nitrogen that can become available to succeeding crops.

Prior manure applications—Some of the nitrogen in manure is released slowly as the manure decomposes. This nitrogen will become available a year or more after it is applied.

Soil test—Results of a good soil test show what is already in the soil's nutrient "bank." These nutrients can be drawn on to provide for the needs of the next crop. Without a soil test, either an "overdraft" or excess of nutrients is likely to occur.

For liquid manure systems, such as holding ponds or lagoons, the best time to get a representative sample is when the manure will be agitated during pumping prior to application. Sampling at this time means the test results cannot be used to plan current application rates. This is a case where book values can be used for the short-term, then modified in the future based on the sample analyses. It should be remembered that a bad sample (one that does not represent the manure being applied) is much worse than no sample at all because it can lead to poor long-term nutrient management.

Information on sampling and testing animal manure is available in Extension publication ID-123, *Livestock Waste Sampling and Testing*. This publication and other information regarding the utilization of animal manure as a nutrient source is available at county Extension offices.

Step 3. Determining Crop Nutrient Needs

The nutrients that need to be applied to grow a crop depend on:

- The crop to be grown.
- · Realistic yield goals.
- Predominant soil type and drainage.
- The previous crop.
- Prior manure applications.
- Soil test results.

Fertilizer recommendations made by the University of Kentucky Cooperative Extension Service take all of these factors into consideration. Other factors such as nutrient source (commercial fertilizer or manures), timing, and method of application can also affect the application rate. Extension publication AGR-1, *Lime and Fertilizer Recommendations*, can be used to determine crop nutrient needs.

Step 4. Calculate Manure Application Rates

The rate of manure to apply for a particular crop depends on:

- The nutrient needs of the crop as determined in Step 3.
- The nutrients available from the manure to be used.
- Selecting a nutrient to base the application rate on. Rates are usually based on how much nitrogen or phosphorus the crop needs.

Information on how to calculate manure application rates for crops grown in Kentucky is given in Extension publication AGR-146, *Using Animal Manures as Nutrient Sources*. A worksheet is included that takes into account the nutrient recommendations, any residual nitrogen from manure, nutrients in pre-plant fertilizer, and the availability of nutrients in manure. A manure rate can then be calculated to supply either the nitrogen, phosphorus, or potassium recommended for the crop. A balance sheet also can be used to determine if additional nutrients are needed. Computer-based spreadsheet programs are also available to calculate application rates.

Manure should not be applied on frozen or snow-covered fields where subsequent rains could wash the manure off the field before it has a chance to move into the soil.



Spring is the best time to spread manure for a summer crop such as corn.

It must be remembered that nutrients in manure, especially nitrogen, are not as readily available to crops as nutrients in commercial fertilizers. Therefore, it is necessary to calculate manure rates based on nutrient availability to be sure crop nutrient needs are met.

Step 5. When Should Manure Be Applied?

The most important factor in determining when manure should be applied is *when the crop can best use the nutrients*. For annual crops such as corn, this usually means spreading manure just before seeding. For perennial crops, such as pasture or hay, timing of application is much more flexible. Most Kentucky farms have some fields that manure can be applied on during any season. Following are some examples:

- Fall—Kentucky has large acreages of cool-season pasture and hay
 fields that could benefit from fall applications of manure. Wheat
 fields and crop fields with cover crops are also good choices. Manure
 should not be applied in fall on crop fields that do not have a cover
 crop to take up and hold nitrogen.
- Winter—Opportunities for manure application in winter are limited.
 The best options are on cool-season forages and small grains in
 February or March. Manure should not be applied on frozen or
 snow-covered fields where subsequent rains could wash the manure
 off the field before it has a chance to move into the soil. Manure
 should not be applied in winter on crop fields that do not have a
 cover crop to take up and hold nitrogen.
- Spring—Spring is the best time to spread manure for a summer crop such as corn. Manure spread in early spring will lose less nitrogen and have the most nutrients available at the time the crop needs them. Spring is not the best time for applying manures to cool-season forages, especially after early April. Nitrogen losses from the manure will be greater at this time, and weed competition could be increased.
- Summer—Manure spread in the summer will have the greatest risk of nitrogen loss through ammonia volatilization. However, if storage facilities need to be emptied, there are options for use. Manure can be applied on alfalfa fields during summer. Select fields with older stands of alfalfa, and apply manure as soon after harvest as possible. Warm-season grass fields used for hay are one of the best options for manure application in summer. Sudangrass responds well to manure applied following harvest in July or August. Manure can be applied on bermudagrass fields any time after a harvest during the summer. Bermudagrass is a heavy user of nutrients, and if it is removed as hay, nutrient accumulation in the soil is reduced.

Manure should be applied close to the time the crop will need the nutrients it supplies. In order to accomplish this, it will be necessary for some farmers to store manure for several months. This need should be taken into account when planning for an animal production enterprise.

The Nutrient Value of Manure

The value of manure is highly dependent on the nutrient status of the field to which it is applied, the nutrient content of the manure, the nutrient needs of the crop to be grown, and the comparative cost of purchasing nutrients from other sources.

The value of any nutrient source is greater when applied to a soil that has a low soil test level for the nutrient(s) being supplied. Manure nutrients in excess of the amount recommended from a soil test are not given any value for comparison. Analysis of a manure sample will determine its nutrient content. Depending on the animal species, manure storage methods, and land application methods, the relative amount of nutrients available to plants can be estimated.

An economic value can be assigned to manure by multiplying these estimates by the cost of purchasing nutrients as commercial fertilizer. This gross value does not reflect differences in the cost of applying manure to the land versus the cost of applying commercial fertilizer. It is not advisable to determine an economic value of manure based on book or average values because nutrient content can vary greatly due to animal species, manure collection and storage, composition of livestock rations, amount of bedding, and the amount of water added.

Annual applications of manure will also add organic matter to the soil. However, this added value is inconsistent and difficult to determine but does provide an additional benefit to the soil.

Nutrient and Manure Use Benefits from Conservation

The greatest benefits from any nutrients applied to the land are derived when those nutrients remain where they were placed. A key factor for maximizing contributions to the soil is to minimize losses from runoff and erosion. Reducing the amount of runoff and erosion will also protect water quality of nearby streams and groundwater resources.

Minimizing water contamination involves reducing the amount of nutrients and manure sediment reaching the water body. Many conservation practices for the control of runoff and sediment movement have been developed, researched, and implemented. These practices include changes in land management and cropping, as well as the installation of complementary structural devices. Any of these practices used individually or in combination are effective in reducing nutrients and sediment from moving to surface water bodies.

The greatest benefits from any nutrients applied to the land are derived when those nutrients remain where they were placed.



Contour strip cropping is one practice that reduces non-point source loss of nutrients due to runoff and erosion.

Including crops with a high phosphorus demand in a rotation can help draw down soil phosphorus levels following manure applications and reduce potential phosphorus losses in runoff water.

Land Management Practices:	Structural Devices:
Cover crops	Grassed waterways
Diverse rotations	Vegetative filter strips
No-till	Terraces
Conservation tillage	Diversions
Contour farming	Grade stabilization structures
Contour strip cropping	

Crop Selection and Rotation

The selection of crops to include in a rotation has been shown to reduce nitrogen movement in soil profiles and lessen phosphorus buildup in the soil surface. Grass-type crops and legumes can effectively "scavenge" soluble nitrogen from previous crops or more recent manure applications. Also, crops with a low nitrogen requirement used in sequence either with previously grown crops that recover nitrogen ineffectively or that have a high nitrogen requirement can effectively reduce the amount of nitrogen needed over a number of years.

Including crops with a high phosphorus demand (alfalfa, corn silage, etc.) in a rotation can help draw down soil phosphorus levels following manure applications and reduce potential phosphorus losses in runoff water. Alfalfa's deep root system can also remove soluble nitratenitrogen from soils at greater depths than many other crops.

Cover Crops

Fall-seeded cover crops of small grains or forage grasses lengthen the time an active vegetative cover exists on a field. This vegetative cover reduces sediment in runoff and helps to slow water runoff, thus increasing infiltration. When used following a high nitrogen-requiring crop, the cover crop can usually satisfy its nitrogen needs by scavenging nitrogen from the soil. This practice is very effective in reducing nutrient runoff following row crops and fall manure application because it provides cover during much of the period of highest rainfall intensity.

No-Till and Conservation Tillage

A major objective for using no-till and conservation tillage is to manage crop residues to reduce runoff of water, nutrients, and sediment. Crop residues left on the soil surface can cover 60 to 100 percent of the land, depending on the timing, implement used, and tillage type. This residue cover reduces rainfall impact on the soil surface and slows runoff, which reduces the amount of nutrients and sediment reaching surface waters. Cover crops and contouring are often used with these tillage systems to further increase nutrient, water, and sediment retention.

Grassed waterways are able to slow water and filter out contaminants. They are often combined with buffer strips or stabilization structures.



The Kentucky Agriculture Water Quality Act requires nutrient management plans on farms 10 acres or greater in size where nutrients are applied and/or utilized.

Contouring

Contouring will create some impediments to water movement. Any type of land roughness (chiseling, crop rows, etc.) or vegetation changes (alternate crop strips, etc.) that slows or impedes water flow will decrease runoff of nutrients and sediment. On less sloping land, row crops are often grown in alternating strips with forages. The forages provide a change in vegetation and serve as a filter. Manure can be applied during fall or spring to the row crop strips while leaving the forage strips to act as filters. A greater reduction in runoff occurs when cover crops are used on the row crop strips.

Filter or Buffer Strips

These 30- to 100-foot wide "strips" of actively growing vegetation are located below or around fields. Some may be located adjacent to and along streams or riverbanks, above lake shores, or above farm ponds. These vegetative buffers or filters slow down runoff from land areas above and can trap nutrients and sediment. They function best under these conditions:

- They are clipped regularly to maintain a plant height of 3 to 6 inches.
- They consist of a thick stand of forage grasses.
- They are not used as field roads. Traffic on these buffers reduces the vegetative cover and promotes gully formation in the wheel tracks.

Grassed Waterways

These grassed areas collect, direct, and manage runoff safely from side slopes to areas lower on the landscape. They have some ability to slow water and filter out contaminants. They are often combined with buffer strips or stabilization structures in a lower landscape position, depending on the width of the relatively flat buffer areas or the need to have water dropped several feet into a ditch, stream, or river. Grassed waterways are frequently used in conjunction with contouring for safe runoff management. Nutrients should not be applied directly to grassed waterways.

Terraces, Diversions, and Stabilization Structures

These structures are used where significant landscape alterations are needed for safe water management. Terraces have some capacity to trap water for significant periods to allow sediment collection and water infiltration. Diversions serve to direct some water around more sensitive areas or areas with higher risk of soil loss as sediment. Frequently, the water is directed into grassed waterways for safe handling. Stabilization structures may range from simple to extensive stream bank stabilization, drainage tile outlets, and water overflow structures at the end of a grassed waterway.

Nutrient cycling in pastures can be monitored by a good soil testing program (Photo courtesy of USDA NRCS)

Nutrient Management Plans Are Required For:

Gost share funds for any Best Management Practice (BMP) on Animal Feeding Operations (AFOs) through the Clean Water Act \$319 Non-point Source Program

Cost-share funds for any BMP on AFOs through the Clean Water Action Plan (CWAP)

Cost-share funds for animal nytaent management BMPs through the Environmental Quality incentives Program (EQIP).

Cost-share funds for animal nutrient management BMPs through the Kentucky Soil Erosion and Water Quality Program.

Pastures Need Some Special Considerations

When forages serve as the sole feed source in pasture systems, nutrients from the manure and urine of grazing livestock will not exceed the amount required by the forages. Livestock concentration in some areas of the pasture, except with rotational grazing, may result in uneven distribution of nutrients. Nutrients leave the pasture system only through animal growth or milk production. In general, only 25 to 30 percent of the nutrients taken in by grazing animals are removed from the field in this manner. The remaining 70 to 75 percent are returned to the pasture in the manure and urine. This recycling of nutrients should be monitored carefully by a good soil testing program. If nutrient management with pastures involves using a crop removal basis for determining the amount of phosphorus and potassium to apply, then only about 30 percent of the calculated amount should be applied. Otherwise, soil test levels may increase rapidly due to the excess of additions over that removed.

Nutrient Management and Conservation

Conservation and nutrient management practices must be coordinated in order to protect surface and groundwater. Reduced tillage and erosion control practices are effective when sediment and any attached nutrients contribute to water contamination. By slowing runoff, water and any associated nutrients are given more time to soak into the soil. Effective crop management and diverse rotations are more important in managing nutrients within a soil profile.

Required Nutrient Management Plans

Nutrient management plans are required by regulation when applying for a Kentucky Pollution Discharge Elimination System (KPDES) Operating Permit for a Confined Animal Feeding Operation (CAFO).

Nutrient management plans are required under the Kentucky Agriculture Water Quality Act and State Agriculture Water Quality Plan on farms 10 acres or greater in size where nutrients (commercial fertilizers or animal manure nutrients) are being applied and/or utilized. This publication was funded by an award received by the University of Kentucky from the U.S.
Environmental Protection Agency to the Kentucky Division of Conservation through 319(h) Nonpoint Source Implementation Program Cooperative Agreement #C9994659-95.

Some publications that will provide more detailed information on many practices for nutrient management include:

																												s	

AGR-16 Taking Soil Test Samples

AGR-57 Soil Testing: What It Is and What It Does

AGR-91 Cropland Rotations for Kentucky

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COOPERATIVE EXTENSION SERVICE UNIVERSITY OF KENTUCKY—COLLEGE OF AGRICULTURE

Taking Soil Test Samples

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The most important part of making fertilizer recommendations is collecting a good, representative soil sample. Soil test results and fertilizer recommendations are based solely on the few ounces of soil submitted to the laboratory for analysis. These few ounces can represent several million pounds of soil in the field. If this sample does not reflect actual soil conditions, the results can be misleading and lead to costly over- or under-fertilization. It is necessary to make sure that the soil sample sent to the laboratory accurately represents the area sampled.

Sample Timing

Soil samples can be collected through much of the year, although fall (September to December) or spring (February to April) are the best times. Fall sampling will often result in a faster return of results and recommendations. Fall sampling will also allow the grower time to have the fertilizer applied well before planting the next crop. However, fall sampling results in lower pH and soil test K levels when conditions are dry. In either case, a field should always be sampled the same time of the year in order to make historical comparisons.

Most fields should be sampled every three to four years. High-value crops, such as tobacco, commercial horticultural crops, alfalfa, red clover, and corn silage, should be sampled annually so that plant nutrient levels can be monitored more closely. Application of manure can change soil test phosphorus, potassium, and zinc levels dramatically, so sampling manured fields each year is also recommended.

Tools You Need

A soil probe, auger, garden trowel, or a spade and knife are all the tools you need to take the individual cores that will make up the "field" sample (Figure 1). You will also need a clean, dry, plastic bucket to collect and mix the sample cores. Be sure not to use galvanized or rubber buckets because they will contaminate the sample with zinc. Soil sample boxes or bags and information forms for submitting samples are available at all county Extension offices.

Collecting Field Crop Samples

An individual sample should represent no more than 20 acres except when soils, past management, and cropping history are quite uniform. The most representative sample can be obtained from a large field by sampling smaller areas on the basis of soil type, cropping history, erosion, or past man-

agement practices (Figure 2). For example, a portion of a field may have a history of manure application or tobacco production while the other part does not. Phosphorus and potassium levels will likely be higher in these areas, causing the rest of the field to be under-fertilized if the field is sampled as one

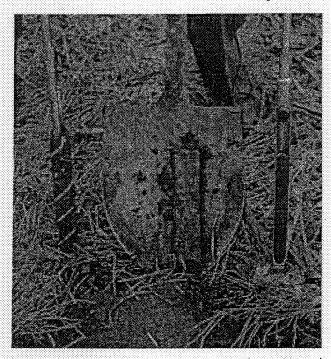


Figure 1. A soil probe, auger, or spade and knife should be used in sampling soils. The spade sample must be trimmed as shown.

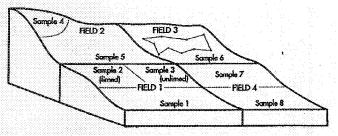


Figure 2. This shows how four fields might require the analysis of one to three composite samples for determining fertility needs. Each composite must contain 10 or more cores, as shown for Sample 6 in Field 3.

unit. It is much better to collect separate samples from these areas because their nutrient requirements are likely quite different from the rest of the field.

If a few years of yield maps are available, these can help identify areas of the field that should be sampled separately.

Soil sampling can also be used to "troubleshoot" areas of the field that are visually different or are consistently low yielding when compared to the rest of the field. Take a sample both from the poor growing area and adjacent areas of good growth. Keep good records indicating where each sample was taken.

Collect at least 10 soil cores for small areas and up to 30 cores for larger fields. Take the soil cores randomly throughout the sampling area and place them in the bucket. Do not sample:

- · back furrows or dead furrows,
- · old fencerows,
- areas used for manure or hay storage and livestock feeding, and
- areas where lime has been piled in the past.

Grid Soil Sampling

With new advances in agriculture and the availability of global positioning satellites, it is now possible to divide a field into smaller units or grid cells that can be sampled individually. Soil test results from each grid can be used to prepare nutrient availability maps of fields. Variable-rate fertilizer and lime applications are then based on these maps. Grid soil sampling and prescription fertilizer maps may result in more accurate recommendations and may lead to greater efficiency in fertilizer use.

Currently the industry standard grid size is 2.5 acres, but Kentucky research shows that variability within areas as small as one acre can be as great as the variability within the entire field. Because soil variability is so high, it is important to treat each grid cell as a field. At least 10 random samples should be

collected across the entire grid cell, rather than a few cores from the center of the grid (Figure 3). Grid sampling can be a good way to identify old field boundaries or parts of fields that have had different management in the past if they are unknown to the current producer. This intensive sampling is costly, and limited Kentucky research has not shown a predictable economic benefit when it is compared to the current recommended method of sampling according to soil type, past history, or past management zones.

Sampling after Banded Fertilizer Applications

Care must be taken when sampling no-till fields that have had fertilizer applied in bands rather than broadcast. Phosphorus, potassium, and zinc are immobile in the soil and remain in the concentrated band for several years after application. If these bands are completely avoided during sampling, soil test results will be lower than "actual," leading to over-fertilization. If bands are included too often, soil test results will be higher than "actual," causing an underestimation of fertilizer needs for the crop.

When the location of the bands is known, it is best to sample in the band one time for every 20 cores taken. If the location of the band is unknown, it is best to take pairs of random samples. The first core is completely random, and the second core is taken one-half the band spacing distance in a direction perpendicular to the band direction. For example, if banded fertilizer was applied on 30-inch spacing, the first core would be randomly selected, and the second sample would be taken 15 inches away (perpendicular to the direction of the band). This process would be repeated at least 10 times in a small field and up to 30 times in a larger field. The more cores that are collected, the more closely the sample will represent "actual" field conditions.

Collecting Lawn or Garden Samples

Sample gardens, lawns, and landscaped areas separately. Collect cores randomly from each area. The area to sample for trees includes the soil below the width of the tree. For shrubs, flower beds, and gardens, sample just the soil where the plants are growing. You should sample problem areas and areas with shrubs, trees, or flower beds separately from other turf or lawn areas. Do not sample:

- · compost areas,
- under the drip-line of trees, and
- · close to driveways or streets.

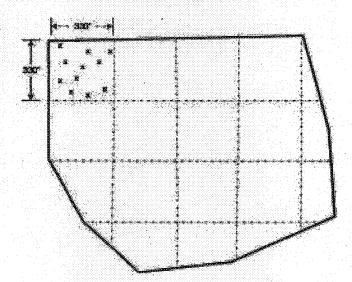


Figure 3. A field can be divided into 2.5-acre grid cells, as shown in the diagram above. Each cell should be treated as an individual field, and approximately 10 random cores should be taken from each cell.

Sample Depth

One commonly overlooked component of soil sampling is the depth of soil to be tested. Most plant nutrients accumulate at the soil surface. This nutrient stratification is a result of past broadcast fertilizer applications and decomposition of plant residue on the soil surface. Because there is a higher concentration of nutrients on the soil surface, soil test values usually go down as the sample depth is increased. To obtain accurate and consistent (between different years) results, samples must be taken to the following depths for these areas:

Tilled Areas—Take soil cores to the depth of the tillage operation (usually 6 to 8 inches).

Non-or Reduced-Tilled Areas—Take soil cores to a depth of 3 to 4 inches for pastures, no-till planting (where fertilizer or lime remains on the soil surface), and minimum-till planting (where fertilizer is incorporated only in the surface 1 to 2 inches).

Lawns and Turfgrasses—Collect soil cores to a depth of 3 to 4 inches.

Sample Preparation

After all cores for an individual sample are collected and placed in the bucket, crush the soil material and mix the sample thoroughly (Figure 4). Allow the sample to air dry in an open space free from contamination. Do not dry the sample in an oven or at an abnormally high temperature. When dry, fill the sample container with the soil (Figure 5).

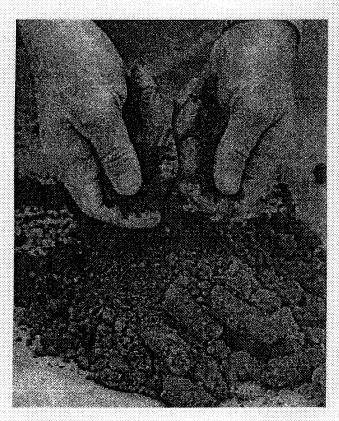


Figure 4. Break up clods while a sample is moist, and spread out to air dry in a clean area.

Sampling and preparing the soil for submission is only half of the process. The other equally important part is filling out a sample information sheet so that the desired crop, tillage, and other information can be considered when making the fertilizer recommendation (Figure 5). The sample information sheet contains all the important information required to provide accurate lime and fertilizer recommendations. Sample information sheets for the University of Kentucky Soil Testing Laboratory can be found on the Web at http://soils.rs.uky.edu/sample1.htm. The types of forms available are the:

- · agricultural form,
- home lawn and garden form, and
- · commercial horticulture form.

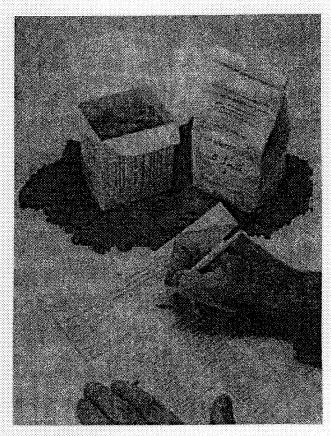


Figure 5. Thoroughly mix the air-dried sample, fill the sample bag or box, mark with your sample designation, fill out the information sheet, and take the sample to your county Extension office.

Each form asks for primary and alternative crops, as well as other background information. The amount of background information needed depends on the crop to be grown. Table 1 is provided as a guide to the background information needed for major agricultural crops (a) and home lawn and garden plants (b). Help on filling out the forms can be provided by your county Extension office.

It is very important to complete the pertinent sections of the sample information form. This will assure that you receive the most accurate fertilizer recommendations possible. Soil samples should be taken to your county Extension office; from there they will be sent to the UK Soil Testing Laboratory. Results and recommendations will be e-mailed to the county office usually within one to two weeks of submission.

Table 1. List of required crop information for accurate lime and fertilizer recommendations.

		Primary (Crop	
Required Information	Corn	Soybeans	Tobacco	Forages
Previous crop	yes1	no ²	yes	no
Primary management	yes	no	no	yes
Previous management	yes	no	no	no
Primary use	yes	no	no	yes
Previous use	no	no	no	no
What was there 2 years ago?	no	no	yes	no
Soil drainage	yes	no	yes	no

		Primary	/ Crop
Required Information	Vegetables & Fruits	Turfgrass	Landscape Plants
Turfgrass location	no²	yes ¹	no

Yes = Information is needed for accurate recommendations.

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No = Information is not needed for accurate recommendations.



COOPERATIVE EXTENSION SERVICE

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Sampling Animal Manure

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nimal manure is an excellent fertilizer for crops and forages. Manure contains nitrogen, phosphate, potash, and
micronutrients that are essential for plant growth. Also, applying manure to land can improve soil tilth, increase water-holding capacity, reduce water and wind erosion, improve aeration,
and promote beneficial organisms. Because of these benefits, a
majority of manure nutrients produced by Kentucky's livestock
and poultry are recycled to the land.

Average manure nutrient content values (book values) provide estimates that can be used for planning purposes. However, manure nutrient concentrations can vary widely among different farms. Factors that influence the nutrient content of manure include animal species, size and number of animals housed, diet composition, feed efficiency, type of manure storage, and manure management factors (frequency of building cleanout, frequency of flushing pits, storage time, amount of water or bedding added to manure, etc.). The unpredictability of nutrient content makes nutrient testing of manure a critical part of a sound manure management plan. This publication provides some guidelines to use when sampling animal manure for laboratory analysis.

When to Sample Animal Manure

To ensure adequate time for a laboratory to complete an analysis and determine manure application rates, you should sample manure within 30 to 60 days of the date you plan to apply it. Nutrient levels in manure storage structures typically do not change rapidly, and an elapsed time of a few weeks between sampling and application is not likely to be critical. Seasonal variations do occur, however, and it is best not to use a manure analysis obtained in the spring for applications in the fall. A manure analysis should be obtained each year.

If it is not possible to obtain an analysis before the manure is applied, you can sample the manure just before or while spreading it. You can use nutrient estimates or historical analysis results to determine an application rate that is not likely to provide an excessive amount of nutrients. Additional nutrients, from manure or chemical fertilizer, can be applied later if the test results show they are needed.

Techniques for Sampling Different Types of Manure

The accuracy of a manure nutrient analysis is only as accurate as the sample sent to the lab. You must collect a sample that is representative of the entire batch of manure being tested. The following sampling techniques for various types of manure will help ensure that you obtain the best possible analysis.

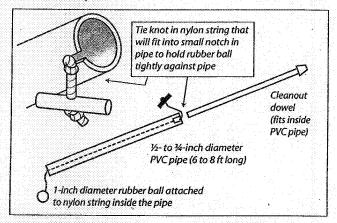
Sampling Manure Slurries from Slotted-Floor Pits

Many swine production facilities use slotted floors over a pit to collect and store manure until application. As manure collects in a pit, solids settle toward the bottom of the pit, and nutrients stratify into layers of varying nutrient content. Because of this stratification, before samples are taken, the pit contents should be mixed (or agitated) for 2 to 4 hours to ensure that a representative sample is obtained. It is very important to use adequate ventilation when agitating slotted-floor pits.

Equipment needed to collect samples from an under-slat pit includes: (1) a composite sampling device such as the one shown in Figure 1, (2) a 5-gallon plastic bucket (do not use galvanized containers because metals in the container such as zinc may contaminate the sample), and (3) a clean, 1-quart, widemouthed plastic bottle with a screw-type lid. NEVER USE A GLASS CONTAINER FOR SAMPLES.

Approximately 10 to 12 subsamples should be taken from different locations throughout the pit. To obtain the subsamples, lower the composite sampling device through the slots until

Figure 1. An example of a composite sampling device for sampling manure from slotted-floor pits.



you feel the bottom of the pit. Then, pull the nylon string running through the interior of the composite sampling device until the rubber ball seals against the bottom of the PVC pipe. Remove the sampling device from the pit, and empty the entire contents into the plastic bucket.

After all subsamples have been collected, swirl or mix the slurry in the bucket, and pour the composite sample into the plastic bottle. Fill the plastic bottle no more than two-thirds full to allow room for expansion caused by the release of gas from the liquid manure sample. Be sure to tighten the lid to prevent the sample from leaking during delivery to the testing lab. Refrigerate or freeze samples that cannot be shipped or delivered to the testing lab on the day of collection.

Sampling Manure Slurries from Earthen Storage Basins (Holding Ponds) and Aboveground Tanks

Manure stored in earthen basins and aboveground tanks is similar to that stored in under-slat pits in that the solids settle and nutrients tend to stratify in storage. Manure in these storage structures should be thoroughly agitated before taking the sample.

The equipment needed to collect samples from storage basins and tanks includes: (1) a composite sampling device such as the one shown in Figure 2, (2) a 5-gallon plastic bucket, and (3) a clean, 1-quart, widemouthed plastic bottle with a screwtype lid.

About 10 to 12 subsamples from different locations around the basin or tank should be collected. To collect subsamples, lower the full length of the composite sampling device (or to within the bottom foot of the storage structure) into the manure slurry, and then pull the nylon string attached to the rubber ball to seal the slurry within the sampling device. Remove the sampling device, and empty the contents into the 5-gallon bucket. After all subsamples have been collected in the bucket, thoroughly mix the slurry in the bucket. Fill the plastic bottle no more than two-thirds full with the composite sample. Securely tighten the lid on the bottle to prevent the sample from leaking.

Sampling Manure Effluent from Lagoons

The nutrient content of lagoon effluent may vary from the top layer to the bottom layer. Obtaining a representative sample from lagoons is difficult and requires collecting subsamples to the depth from which the effluent will be applied. For example, if effluent is pumped only from the top layer of the lagoon without any agitation, you need to sample only from that portion that is to be pumped. If a lagoon will be agitated when it is pumped, it is best to sample from the fully mixed lagoon or to take several subsamples on the discharge side of the pump. Producers with multistage systems should collect samples from the lagoon that will be pumped for land application. Two methods that can be used to sample lagoon effluent—the pole and cup method and the composite (or profile) method—are described below.

Figure 2. An example of a composite sampling device for sampling manure from earthen basins and aboveground tanks.

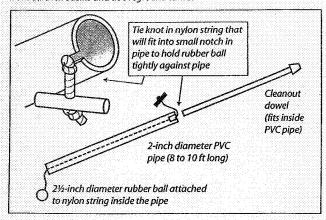
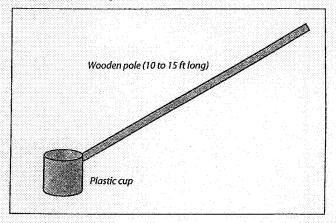


Figure 3. An example of a pole and cup sampling device for sampling manure effluent from lagoons.



Pole and Cup Method

The equipment needed to sample lagoons using the pole and cup method includes: (1) a pole and cup liquid manure sampling device such as the one shown in Figure 3, (2) a 5-gallon plastic bucket, and (3) a clean, 1-quart, widemouthed plastic bottle with a screw-type lid.

Using the pole and cup sampling device, collect 10 to 12 subsamples by extending the sampling device the length of the pole toward the center of the lagoon, and dip a cupful of lagoon effluent. Do not collect solids, floating debris, or scum with the subsample. Each of the subsamples should be taken from different locations around the lagoon. As each subsample is collected, pour the contents into the 5-gallon plastic bucket. After all subsamples have been collected, thoroughly mix the contents in the bucket. Fill the plastic bottle about two-thirds full with the composite sample. Securely tighten the lid to prevent the sample from leaking.

Composite (or profile) method

The composite (or profile) method of sampling allows subsamples to be taken from the full depth of the lagoon. The equipment needed for this sampling method includes: (1) a composite sampling device such as the one shown in Figure 4, (2) a 5-gallon plastic bucket, and (3) a clean, 1-quart, widemouthed plastic bottle with a screw-type lid.

Approximately 10 to 12 subsamples taken from different spots in the lagoon are needed to obtain a representative sample. Ideally, a small boat that could be paddled into the lagoon would be used to collect samples away from the edges. To collect subsamples, lower the full length of the composite sampling device into the lagoon, or lower the device until it reaches the bottom of the lagoon (be careful not to plug the end of the sampling device with sludge at the bottom of the lagoon). Then, pull the nylon string running through the interior of the composite sampling device until the rubber ball seals against the bottom of the PVC pipe. Remove the sampling device from the lagoon, and empty the entire contents into the plastic bucket.

After all subsamples have been collected in the bucket, thoroughly swirl or mix the effluent. Fill the plastic bottle no more than two-thirds full with the composite sample. Securely fit the lid on the bottle to prevent the sample from leaking.

Sampling Dry Manure Stacks or Litter Piles

Solid (dry) manure and poultry litter is often stored outside in a stack pad, horizontal concrete silo located above ground, or litter storage shed. Collecting a representative sample from these types of storage structures requires: (1) a shovel or solid manure sampling device such as the one shown in Figure 5, (2) a wheelbarrow, (3) a 5-gallon plastic bucket, and (4) a 1-quart plastic freezer bag.

Identify 10 to 12 widely dispersed points on the manure stack or litter pile that represent the average moisture content of the manure. The sampling points should include the center of the stack or pile as well as some near the edges. From each of these points, remove the top crust layer, collect 3 to 5 subsamples with the shovel or solid manure sampling device, and place the

and crumble the collected subsamples, and place one shovelful in the plastic bucket. Repeat this process from each of the collection points. After collecting subsamples from each point, crumble and thoroughly mix all of the subsamples in the bucket. Fill the freezer bag two-thirds full (do not completely fill) with the composite sample, compress the air from the bag, and seal the bag. It is a good practice to tape over the seal to ensure that the bag does not come open during transit to the testing lab.

A key factor in obtaining a good sample from solid manure

collected litter or manure in the wheelbarrow. Thoroughly mix

A key factor in obtaining a good sample from solid manure and litter storage facilities is to collect multiple subsamples from throughout the stack or pile at a time when the nutrient content is fairly stable. Unless the manure or litter is to be spread within the next few days, samples should not be collected from a freshly loaded or turned manure stack or litter pile. The nutrient content should stabilize within about two weeks of forming a new pile or turning an existing pile.

Sampling Dry or Solid Manure from Paved Lots

In certain livestock production systems, animals are housed on paved feedlots where the manure that accumulates is scraped and hauled to the field (the "scrape-and-haul" method of manure utilization). The manure is typically removed from the paved area daily or several times each week. Equipment needed for collecting manure samples from paved lots includes: (1) a shovel, (2) a wheelbarrow, and (3) a 1-quart plastic freezer bag.

Approximately 10 to 12 subsamples should be collected from the paved lot. When identifying the areas of the paved lot to sample, be sure to choose areas that best represent the proportion of any variable conditions you observe, such as variations in moisture content, amount of bedding, etc. Each subsample should be collected by scraping the shovel across about 25 feet of the paved lot. After scraping across the paved lot, place the manure on the shovel in the wheelbarrow. Once all subsamples have been placed in the wheelbarrow, use the shovel to thoroughly mix and crumble the manure. Then, fill the freezer bag approximately two-thirds full with the composite sample. Compress any air remaining in the bag before sealing it.

Figure 4. An example of a composite sampling device for sampling manure effluent from lagoons.

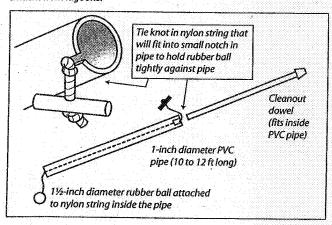
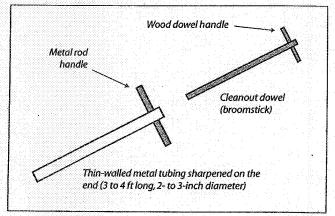


Figure 5. An example of a solid manure sampling device for sampling manure from dry manure stacks or litter piles.



Sampling Poultry Litter before Full Cleanout

The point method and trench method are two options suitable for sampling poultry litter in the house. The objective of both methods is to obtain a sample that is representative of the litter within the entire house. Obtaining an adequate sample may take more than 30 minutes. Although this may seem an excessive amount of time, it is necessary to follow the proper procedures to ensure usable results.

Point method

Equipment needed to sample litter using the point method includes: (1) a 5-gallon plastic bucket, (2) a narrow, square-ended spade or a solid manure sampling device (Figure 5), and (3) a 1-quart plastic freezer bag.

The first step in the point method is to visually divide the house into three zones. For example, if the house runs in the north-south direction, divide the house into east, middle, and west zones (Figure 6). Walk the length of the building within a zone in a zigzag pattern and take 8 to 10 random subsamples with the spade (or solid manure sampling device) along your path. When taking each subsample, clear a small trench the width of the spade to a depth just above the dirt floor. Then take a 1-inch slice as the subsample, being sure to get equal amounts of litter the entire depth of the trench (Figure 7). Be sure to take a representative number of subsamples under feeders and waterers. Place each of the subsamples into the plastic bucket. This process should be repeated in each of the three zones.

Once subsamples have been collected from each zone, thoroughly mix and crumble all of the litter in the bucket. It may be necessary to pour the litter into a wheelbarrow or onto a piece of plywood to facilitate mixing. After thoroughly mixing, fill the freezer bag about two-thirds full with the composite sample. Be sure to compress the air from the bag before sealing it.

Trench method

Equipment needed to sample litter using the trench method includes: (1) a narrow, square-ended spade, (2) a wheelbarrow, (3) a 5-gallon plastic bucket, and (4) a 1-quart plastic freezer bag.

With the trench method, the building is divided into two areas—the brooder portion of the house and the non-brooder portion of the house (Figure 8). In approximately the middle of the brooder area, dig a trench the width of the spade from the centerline of the house to the sidewall. The trench should extend down through the litter to just above the dirt floor. Place all litter removed from the trench into the wheelbarrow. Repeat this process in the non-brooder portion of the house.

Depending on the width of the house and the depth of the trench, the amount of collected litter may exceed the capacity of the wheelbarrow. If this is the case, each time the wheelbarrow is two-thirds full, thoroughly mix and crumble the litter from the trenches. After mixing, remove one shovelful of litter and place it in the 5-gallon bucket. Empty the remainder of the litter from the wheelbarrow near the side of the trench. Repeat

Figure 6. An example of zone identifications and sampling patterns for the point method.

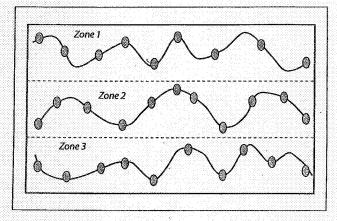


Figure 7. For the point method, use a square-ended spade to dig a small trench and take a subsample.

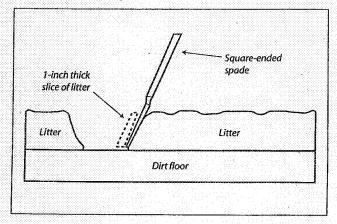
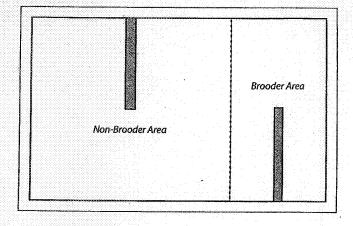


Figure 8. An example of zone identifications and sampling patterns for the trench method.



this process until both trenches have been completed. Then, thoroughly mix the litter collected in the bucket. Fill the freezer bag about two-thirds full with the composite sample, taking care to compress the air from the bag before sealing it.

Sampling Poultry Litter during Full Cleanout

Equipment that will be needed to sample poultry litter when the entire house is being cleaned out includes: (1) a shovel, (2) a wheelbarrow, (3) a 5-gallon plastic bucket, and (4) a 1-quart plastic freezer bag.

Take one shovelful of litter from each truckload of litter removed and place it in the wheelbarrow. Depending on the volume of litter being removed, the amount of collected litter may exceed the capacity of the wheelbarrow. If this occurs, each time the wheelbarrow is two-thirds full, thoroughly mix the contents of the wheelbarrow and place one shovelful of litter in the 5-gallon bucket. Repeat this process until each truckload of litter has been sampled. Then, thoroughly crumble and mix the litter in the bucket. Fill the freezer bag about two-thirds full with the composite sample. Compress the air from the freezer bag before sealing it.

Either the point method or the trench method can also be used to sample litter from the house immediately before cleaning it out.

Handling and Labeling Manure Samples

Ideally, manure samples should be mailed or delivered to the laboratory the day they are collected. If manure samples must be held longer than 24 hours, refrigerate or freeze the samples until they can be shipped to the testing lab. Do not let manure samples sit in hot areas such as the dashboard or trunk of a vehicle. If manure samples cannot be hand delivered to the testing lab, they should be mailed or shipped early in the week (Monday through Wednesday) to avoid arrivals on the weekend. Also, avoid shipping near holidays that could delay delivery.

All samples sent to the testing lab should be clearly labeled with a permanent marker. Include on the label the owner's or operation's name and address, sample identification number, date sample collected, and type of manure.

Where to Send Manure Samples for Analysis

The Soil Testing Lab at the University of Kentucky Regulatory Services provides an analysis of animal manures that includes these factors:

- · moisture (for solid manures)
- · total nitrogen (N)
- phosphorus (reported as P,O₅)
- potassium (reported as K₂Ö)
- calcium (Ca)
- magnesium (Mg)
- copper (Cu)
- zinc (Zn)
- iron (Fe), and
- manganese (Mn).

Nutrient concentrations are reported as pounds per ton for solid manures and as pounds per 1,000 gallons for liquid manures. The cost of the analysis is \$20.

To obtain an analysis from UK Regulatory Services, take manure samples to the local county Extension office. These offices have plastic bottles for liquid manure samples and an information sheet (also included in this publication) to fill out for the sample being submitted. The Extension office will send the sample to:

UK Regulatory Services Attention: Soil Lab 103 Regulatory Services Building Alumni and Shawneetown Roads University of Kentucky Lexington, KY 40546-0275

Local county Extension agricultural agents can provide assistance with manure sampling, interpreting analysis results, and determining application rates. Two Extension resources—the Manure Management Planner Spreadsheet, a Microsoft® Excel-based computer program, and AGR-146, *Using Animal Manures as Nutrient Sources*—are available at local county Extension offices for calculating manure application rates based on manure analysis results and soil test recommendations.

Table 1 shows a partial listing of commercial laboratories that are also available for conducting analyses on manure samples. These labs can usually provide a detailed analysis of manure, including the different forms of nitrogen and most trace elements.

Conversion Information for Manure Test Results

Because different labs report results in different ways, the following conversion chart may be helpful in interpreting individual results.

P (elemental phosphorus) x 2.27 = P_2O_5 (phosphate)

K (elemental potassium) x 1.2 = K_2O (potash)

percent (%) \times 20 = pounds per ton

percent (%) \times 80 = pounds per 1,000 gallons

percent (%) x 2,254 = pounds per acre-inch

mg/L (milligrams per liter) x 0.002 = pounds per ton

mg/L (milligrams per liter) x 0.008 = pounds per 1,000 gallons

mg/L (milligrams per liter) x 0.225 = pounds per acre-inch

pounds per ton $\times 4.17 = pounds per 1,000 gallons$

pounds per 1,000 gallons x 0.2398 ₹ pounds per ton

1 gallon = 8.34 pounds

1 acre-inch = 27,154 gallons

mg/L (milligrams per liter) = ppm (parts per million)

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Laboratory	Ty	oes of Analyses ^{be}
A&L Analytical Laboratories, Inc.	(1)	
411 North 3rd Street	(2)	Basic M2 analysis – moisture, total N, P ₂ O ₅ , K ₂ O, Ca, Mg, Na, S, Fe, Al, Mn, Cu, Zn
Memphis, TN 38105 Phone: (901) 526-1031		
Web site: www.al-labs.com		
O		
Chemical Services Lab	(1)	NPK analysis – total N, P ₂ O ₅ , K ₂ O
3303 Industrial Parkway	(2)	NPK analysis plus trace elements – total N, P ₂ O ₅ , K ₂ O, Ca, Mg, Fe, Mn, Cu, Zn, SO ₄
Jeffersonville, IN 47130		
Phone: (812) 280-1090		
Holmes Laboratory, Inc.	(1)	Test K – total solids, moisture, pH, total N, ammonium N (NH ₄), P ₂ O ₅ , K ₂ O, Ca, P, Mg, K
3559 U.S. Rt. 62	(2)	Test M – total solids, moisture, pH, total N, ammonium N (NH ₄), P ₂ O ₅ , K ₂ O, Ca, P, Mg, K,
Millersburg, OH 44654		Na, Cu, Mn, Zn, Fe
Phone: (330) 893-2933		
Web site: www.holmeslab.com		
Iowa Testing Laboratories, Inc.	(1)	Standard analysis – moisture, total N, P ₂ O ₅ , K ₂ O
Highway 17 North	(2)	Analysis of trace elements - Ca, P, K, Mg, S, Zn, Mn, Cu, Fe, Co, Na
P.O. Box 188	(3)	Complete analysis – moisture, total N, P ₂ O ₅ , K ₂ O, Ca, Mg, S, Zn, Mn, Cu, Fe, Co, Na
Eagle Grove, IA 50533		
Phone: (515) 448-4741		
Web site: www.swine.net/itl.htm		
Spectrum Analytic, Inc.	(1)	NPK analysis – total N, P ₂ O ₅ , K ₂ O, moisture/DM
P.O. Box 639	(2)	Complete analysis - total N, ammonium N (NH ₄), nitrate N (NO ₃), total P ₂ O ₅ , available P ₂ O ₅ ,
1087 Jamison, Road		K ₂ O, pH, moisture/dry matter, Ca, Mg, S, B, Cl, Cu, Fe, Mn, Zn, Al, As, Ba, Cd, Cr, Co, Pb,
Washington Courthouse, OH 43160		Hg, Mo, Ni, Se, Si, Ag
Phone: (800) 321-1562		
Web site: www.spectrumanalytic.com		

It is recognized that this is not an all-inclusive list of commercial laboratories. Neither endorsement of companies or their services mentioned is intended, nor is criticism implied of similar companies or their services not mentioned.

The cost of manure analyses will vary among commercial laboratories. However, most basic manure analyses (total N, P₂O₅, and K₂O) will typically range from approximately \$20 to \$40, and more complex analyses (additional forms of N and more complete analysis of trace elements) will usually range from approximately \$40 to \$75. Contact the specific testing lab for a current schedule of fees.

Many of the commercial laboratories mentioned conduct additional analyses that are not listed here (such as ammonium N, nitrate N, carbon:nitrogen ratio, organic matter, solids, electrical conductivity, etc.). Contact the specific testing lab of interest for a more complete listing of available analyses.

Many commercial laboratories will provide sample containers for manure samples that are being sent to their labs. Contact the specific commercial testing lab to learn if sample containers are available.

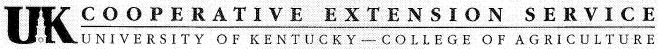
UNIVERSITY OF KENTUCKY

College of Agriculture Cooperative Extension Service AGRICULTURAL ANIMAL MANURE SAMPLE INFORMATION SHEET

Department of Agronomy

Division of Regulatory Services

Section I. Owner Information	Section II. Test to be Made	Section VI. Lab Use
DATE SAMPLED:/	Routine (Total N, P ₂ O ₅ , K ₂ O, and	
NAME:	maisture for solids)	Section VII. County
ADDRESS:		
CITY: STATE: ZIP:		County Code
PHONE:		
Owner's Sample ID:		County Sample No.
Section III. Type of Animal Manure		Section VIII. Lab Use Only
Poultry Solid		
Dairy Liquid		Billing Code
Swine		
Beef		
Section IV. Animal Waste Application History		
Section V. Other Information		
Paid		
raiu <u></u>	Signature of Extens	ion Agent



2008-2009 Lime and Nutrient Recommendations

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Soils with Naturally High Contents of P and K

Some soils naturally contain higher levels of P and K, thus having the ability to supply higher amounts for crop production. Soils developed from phosphatic limestones will likely

To Co	10000	xide value: Multiply
From:	To:	Ву:
P ₂ O ₅	Р	0.44
Р	P ₂ O ₅	2.29
K ₂ O	K	0.83
K	K ₂ O	1.20

maintain high soil test P levels without fertilization as will some soils containing high native K levels.

Elemental and Oxide Values for P and K

Soil test values for phosphorus and potassium are reported as pounds of elemental P or K per acre (lb/A). Nutrient recommendations are made on the oxide basis: pounds of phosphate (P_2O_5) or potash ($K_2O)$ per acre. Use the factors in Table 2 when converting from elemental to oxide and vice versa.

Plant Analysis

A plant analysis may be used to verify a suspected nutrient problem or to evaluate the nutrient status of a crop. Plant analysis is not a substitute for a soil test but should be used along with a soil test. Your county Extension agent has information on plant analysis services available for various crops, or see University of Kentucky Extension publication AGR-92, Sampling Plant Tissue for Nutrient Analysis.

Collecting a Representative Sample

In order to get reliable recommendations, it is important that the submitted soil sample accurately represent the field or area from which it was taken. Analytical results provided on the soil test report form are for the sample submitted, and the listed recommendations are based on those results. All recommendations are made on the assumption that a properly representative soil sample was properly taken. If soil sampling procedures are questionable, accurate nutrient and lime recommendations for the sampled field or area cannot be assured. Because results vary somewhat between fall and spring, it is better to consistently sample any given field in fall or spring. See University of Kentucky Extension publication AGR-189, Managing Seasonal Fluctuations of Soil Tests, for details. When sampling untilled fields in the fall, an equal number of cores should be collected from both between and close to the rows. Following a prolonged drought, soil water pH can be as much as 0.5 pH unit lower if the soil was not rewet prior to sample collection. To calculate a lime recommendation under these conditions, assume that the current water pH is about 0.5 units lower than normal and that the buffer pH has not been affected. Using the tables in this publication, apply lime as recommended with the estimated water pH (now raised by 0.5 pH units) and the sample buffer pH.

Sampling Depth and Frequency

For tilled areas, take soil cores to a depth of 6 to 7 inches. With pastures, lawns, no-tilled areas, and turf, take soil cores to a depth of 3 to 4 inches. Because of high fertilizer and commodity prices, each production field should be sampled every two years. Annual sampling is preferable for high-value crops

that remove large amounts of soil nutrients, such as alfalfa and double-crop silage. Sampling each year after manure application is also recommended. See University of Kentucky Extension publication AGR-16, *Taking Soil Test Samples*, for details.

Nutrient Recommendations

Samples Testing Low in P and K

If soil tests for phosphorus and potassium are low, one-third to one-half of the recommended amounts of P_2O_5 and/or K_2O for corn can be used if it is banded 2 to 4 inches from the row.

Samples Testing High in P and K

When soil test levels for P and K are so high that no nutrient recommendation is made for the current year, there is no assurance that these high levels will be maintained for optimal production in the following years. When soil test levels are in the lower portion of the high range, the area should be sampled again the following year.

Recommendations without Soil Tests

If nutrient recommendations must be made without soil test results, assume low levels of residual N, P, and K.

Recommendations for Multiple Years

If one nutrient recommendation is made for two years of sequential cropping, the recommended rates of phosphate and potash for each crop are added together and applied to the first crop grown. However, this method is not recommended for crops with a high nutrient demand, e.g., alfalfa, corn for silage, tobacco, etc. Double-cropping recommendations for small grains and soybean can be found in the "Small Grains" and "Soybean" sections.

Nutrient Value of Manures and Tobacco Stalks

Animal manure and tobacco stalks add nutrients when applied to soils. These should be considered when deciding on materials to use in fulfilling crop nutrient recommendations. The best method to determine the nutrient content of these materials is through sampling and analysis of the manure/stalks. In cases where it is not possible to take samples in a timely manner, Table 3 can serve as a guide in estimating nutrients contained in the materials listed until samples can be obtained and tested.

When applying organic materials to soil, it is important to remember that some of the nutrients they contain are not as available to the next crop as those nutrients contained in commercial fertilizers. While almost 100% of the potash is available, only about 80% of the phosphate is expected to be available to the next crop. Organic nitrogen availability is variable, with nitrogen from manure especially dependent on livestock species/diet, storage and handling methods, and the timing and method of application.

Animal manures also contain significant amounts of calcium, magnesium, sulfur, zinc, copper, and molybdenum that may be of value to crops. The added organic matter can also be of significant benefit to soils low in organic matter.

University of Kentucky Extension publication AGR-146, Using Animal Manures as Nutrient Sources, and a computer

Nutrients Removed by Agronomic Crops

Good nutrient management involves effective use of applied nutrients at rates utilized by crops. As a basis of assessing long-term soil fertility trends, crop nutrient removal should be used. Crop nutrient removal is the quantity of nutrients removed from a field in the harvested portion of the crop. This should not be confused with crop nutrient uptakes, which is the total amount of nutrients taken up by the entire crop (roots, stems, leaves, and seed) in a field. For quick reference, Table 5 includes crop nutrient removal values, published in University of Kentucky Extension publication IP-56, Assessment of the Potential for Livestock and Poultry Manure to Provide the Nutrients Removed by Crops and Forages in Kentucky, and in "NRCS Nutrient Management Standard Code 590."

Soil Buffer Test

The pH of the soil is a measurement made from a mixture of soil and water and is reported for all samples. The soil buffer test is performed and used to determine lime requirement for samples with a soil pH of 6.4 or below. In the soil buffer test, a buffer solution is mixed with soil, and the pH of the resulting suspension is measured. The result from the buffer test is reported as buffer pH. The buffer pH together with the soil pH can be used to determine the lime requirement to change the soil pH to a greater desired level. The University of Kentucky soil test laboratories started using the Sikora buffer in 2005, replacing the SMP buffer which contained hazardous chemicals (chromium and p-nitrophenol). The Sikora buffer provides the same buffer pH as the SMP buffer, so changes in agronomic interpretation of the data were not required.

All recommendations for agricultural lime are now based on 100% effective lime (100% RNV). Therefore, the lime recommendations in Tables 6, 7, and 8 are not for bulk lime but for 100% effective lime.

To determine how much lime is required to raise soil-water pH, see the table with your target pH in the heading. Tables 6, 7, and 8 give lime rate recommendations for target soil pH values of 6.4, 6.6, and 6.8, respectively. Limestone rate recommendations in these tables are given for water pH and buffer pH combinations in increments of 0.2 pH units. (Computerized recommendations use 0.1 pH unit increments.) To determine limestone rates, read down the left side of the appropriate table to the sample's water pH value, then read across until reaching the column head with the appropriate buffer pH value. If hydrated lime is applied, use the rate shown as 100% effective lime.

Water pH			Bu	ffer pH	of Sam	ple			If Buffer pH
of Sample	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	Is Unknown
4.5	4.67	4.0	4.0	3.33	2.67	2.67	2,0	2,0	2.67
4.7	4.67	4.0	4.0	3.33	2.67	2.67	2.0	2.0	2.67
4.9	4.67	4.0	4.0	3.33	2.67	2.67	2.0	2.0	2.67
5.1	4,67	4.0	3.33	3.33	2.67	2.0	2.0	1.33	2.67
5.3	4,67	4.0	3.33	2.67	2.67	2.0	2.0	1.33	2.33
5.5	4.0	3.33	3.33	2.67	2.67	2.0	1.33	1.33	2.00
5.7	4.0	3.33	2.67	2.67	2.0	2,0	1.33	1.33	1.67
5.9		3.33	2.67	2.0	2.0	1.33	1.33	0.67	1.33
6.1	-	_	2.0	2.0	1.33	1.33	0.67	0.67	1.00

Water pH			Bu	ffer pH	of Sam	ple			If Buffer pH
of Sample	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	Is Unknown
4.5	4.67	4.67	4.00	4.00	3,33	2.67	2.67	2.00	4.00
4.7	4.67	4.67	4.00	4.00	3.33	2,67	2.67	2.00	3.67
4.9	4.67	4.67	4.00	4.00	3.33	2.67	2.67	2.00	3.33
5.1	4,67	4.67	4.00	3.33	2,67	2.67	2.67	2.00	3.00
5.3	4.67	4.67	4.00	3.33	2.67	2.67	2.00	1.33	2.67
5.5	4.67	4.00	3,33	3.33	2,67	2.00	2.00	1.33	2.33
5.7	4.00	4.00	3.33	2.67	2.67	2.00	1.33	1.33	2.00
5.9		3.33	2.67	2.67	2.00	2.00	1.33	1.33	1.67
6.1	-		2.67	2.00	2.00	1.33	1.33	0.67	1.33
6.3	÷		-	2.00	1.33	1.33	0.67	0.67	1.00

Water pH			Bu	iffer pH	of Sam	ple			If Buffer pH
of Sample	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	Is Unknown
4.5	4.67	4.67	4.67	4.00	3.33	3.33	2.67	2.00	4.00
4.7	4.67	4.67	4.67	4.00	3.33	3.33	2.67	2.00	4.00
4.9	4.67	4.67	4.67	4.00	3.33	3.33	2.67	2.00	4.00
5,1	4.67	4.67	4.67	4.00	3.33	3.33	2,67	2.00	4.00
5.3	4.67	4.67	4.67	4.00	3,33	2.67	2.00	2.00	3.67
5.5	4,67	4.67	4.00	3.33	3.33	2.67	2.00	2.00	3.33
5.7	4,67	4.67	4.00	3.33	3.33	2.67	2.00	1.33	3.00
5.9		4.00	3.33	3.33	2.67	2.67	2,00	1.33	2.33
6.1			3.33	2.67	2.67	2.00	1,33	1.33	2.00
6,3	-	•	-	2.00	2.00	2.00	1.33	0.67	1.67
6.5		-	-	-	1.33	1.33	1.33	0.67	1.33

Because agricultural limestone is rarely 100% effective, the bulk lime rate required will need to be determined for each available lime source, based on the RNV. The bulk lime recommendation can be determined from Table 9 using the 100% effective lime recommendation and the RNV for the lime to be purchased. It can also be determined using this formula:

Bulk Lime Rate = 100% Effective Lime Rate Recommendation ÷ RNV x 100

The bulk lime values in Table 9 are rounded to the nearest 0.5 ton. Therefore, the amount calculated by the formula above will not always be the same as the amount in Table 9.

The adjustment of soil pH by limestone is affected by: (1) thoroughness of mixing into the soil; (2) depth of mixing into soil (top 6 inches is assumed); (3) time of reaction (four years are needed

Товассо

Lime

Limestone should be applied in the fall and thoroughly mixed with the soil one to two years ahead of the crop. If applied in the spring before transplanting, or if more than 4 T/A are applied, plow one-half down and disc in the other half for soils with a water pH below 6.0.

Rates—If water pH is below 6.4, see page 5, and use the rate appropriate for a target pH of 6.6.

Nitrogen

Rates—Nitrogen fertilization rates (see Table 10) depend primarily on the field cropping history and soil drainage class. See page 2 for soil drainage classes. Rotation to other crops is strongly recommended after two or more years of burley tobacco production in the same field. More frequent rotation may be necessary when growing dark tobacco or burley tobacco varieties with low levels of disease resistance.

Sources—All commonly available N sources can be used satisfactorily on tobacco, particularly on well-drained soils where a good liming program is followed and soil pH is maintained in the range of 6.0 to 6.6. If soil pH is moderately to strongly acid (pH 6.0 or less) and no lime is applied, using a nonacid-forming source of N (sodium nitrate, calcium nitrate, or sodium-potassium nitrate) will lower the risk of manganese toxicity. Use these sources (or ammonium nitrate or potassium nitrate) for sidedressing because nitrate-nitrogen is more mobile in soil than ammonium nitrogen. If tobacco is grown on sandy soils or soils that tend to waterlog regardless of pH, using ammonium sources (urea, ammonium nitrate, ammoniated phosphates, ammonium sulfate, nitrogen solutions) will lower the risk of leaching and denitrification losses.

Time and Method—The entire nitrogen requirement can be broadcast pre-plant on well-drained soils. However, Kentucky often has large amounts of rainfall during April and May, so applying the broadcast nitrogen as near to transplanting as possible will significantly lessen the chances of loss. Apply the nitrogen after plowing and disc into the surface soil.

Because losses of fertilizer nitrogen can occur on sandy soils or soils with poor drainage, it is helpful to split nitrogen applications on these soils, applying one-third of the nitrogen before transplanting and the remaining amount two or three weeks af-

ter transplanting. The use of poorly drained or somewhat poorly drained soils for to-bacco production is not recommended.

Further efficiencies in nitrogen use, decreased manganese toxicity, and increased early growth can be obtained by banding (sidedressing) most

Table 10. Nitrogen recommendations (lb/A), burley and dark tobacco.

	Soil Dra	inage Class
N Levels	Well- Drained	Moderately Well-Drained
Low ¹	225 - 250	250 - 275
Medium ²	200 - 225	225 - 250
High ³	150 - 175	175 - 200

¹ Following tobacco or row crops.

² First-year tobacco following a grass or grass-legume sod.

First-year tobacco following legume sod or legume cover crop. of the nitrogen after transplanting. These bands should be applied 10 to 12 inches to the side of the row in either one or two bands and at depths of 4 to 5 inches. The nitrogen should be banded at one time 0 to 10 days after transplanting or split into two applications with two-thirds at 0 to 10 days and one-third at four to five weeks after transplanting. If one-third or more of the total nitrogen is applied after transplanting, the rate from Table 10 should be reduced by 15 to 25 lb N per acre.

Animal Manures

Animal manures are known to contain chloride in concentrations high enough to reduce the quality of cured tobacco. Cured tobacco leaf containing more than 1% chloride is considered unacceptable by the tobacco industry. Cattle and swine manure applications should be limited to no more than 10 tons per acre. Poultry manures should not be applied in the year tobacco is grown. Fall applications of poultry litter should not exceed 4 tons per acre on ground where tobacco will be planted the following spring. Fall manure applications should be made only when a living cover crop will be present to take up and recycle some of the available N.

Phosphate and Potash

Rates—Phosphorus and potassium fertilizer additions should be guided by soil testing. Based on soil test results, apply the recommended amounts indicated in Table 11. Research indicates that when soil test potassium is below 225 lb per acre, a broadcast application of potassium fertilizer is more effective than banding.

Sources—Research at the University of Kentucky has shown that applications after January 1 of chloride-containing nutrient sources such as muriate of potash at rates greater than 50 lb of chloride per acre lead to excessive levels of chloride in the cured burley tobacco leaf, increased curing and storage problems, decreased combustibility of the leaf, and, ultimately, greatly reduced quality and usability of the cured leaf. Consequently, sulfate of potash should be the major potassium fertilizer used after January 1. Because animal manures contain chloride, applications of dairy and swine manure should not exceed 10 tons per acre. Poultry manures should not be applied in the year tobacco is grown. Excessive rates of manure or manure used in conjunction with chlorine-containing fertilizers may result in unacceptable chlorine levels in the cured leaf.

Molybdenum

Molybdenum (Mo) is recommended for use on burley tobacco either as a broadcast soil application or dissolved in transplant setter water when the soil pH is below 6.6. Recent research and field trials have shown that setter water applications are equally as effective as broadcast applications in supplying molybdenum to the crop. Molybdenum can be purchased in dry solid or liquid forms. Either source is satisfactory when molybdenum is needed.

Soil Broadcast—Apply at the rate of 1 lb of sodium molybdate (6.4 oz of molybdenum) per acre. Dissolve this amount of dry sodium molybdate (or 2 gallons of 2.5% Mo liquid product) in 20 to 40 gallons of water and spray uniformly over each acre. Apply before transplanting and disc into the soil. Because sodium molybdate is compatible with many herbicides used on tobacco,

CORN

Lime

If water pH is below 6.2, see page 5, and use the rate appropriate to attain a target pH of 6.4.

Nitrogen

Also see the "Fertility Management" chapter in University of Kentucky Extension publication ID-139, A Comprehensive Guide to Corn Management.

Winter Legume Cover Crops—A winter legume cover crop can provide a substantial amount of nitrogen for corn with either no-tillage or conventional tillage.

Research conducted by the University of Kentucky on no-tillage corn indicates that some legume cover crops can provide yield advantages beyond that provided by fertilizer nitrogen. Hairy vetch performed better than crimson clover or big flower vetch. The dense mulch resulting from a killed legume cover crop conserves soil water, aids in weed control, and helps to control soil erosion.

Three important factors should be considered when using a legume cover crop:

- 1. The amount of nitrogen provided will depend on the amount of growth the legume makes before it is chemically killed or plowed under. However, corn planting should not be delayed later than mid-May, particularly on well-drained soils.
- A cover crop, legume or non-legume, can deplete soil water during a dry spring, resulting in decreased germination and seedling growth of corn.
- 3. Some vetch seeds are hard and can remain in the soil for one or more years before germinating. The result can be volunteer vetch in small grains grown in rotation with corn unless the vetch is killed with herbicides in the early spring.

Placement—Small amounts of N plus K_2O can be applied in the row, but if more than 15 lb/A of N plus K_2O is banded, it should be banded at least 2 inches below the soil surface and 2 inches to the side of the seedrow center. No more than 100 lb/A of N plus K_2O should be banded near the row. Fertilizer for banding near or in the row should not contain urea.

Adjustments to Nitrogen Recommendations

Irrigation—The nitrogen rate on irrigated corn should be increased to 175 to 200 lb N/A due to increased risk of depletion of available N from crop uptake, leaching, and denitrification.

Sidedressed N—On moderately well-drained to poorly drained soil, rates of nitrogen can be decreased by 35 lb/A if as much as two-thirds of the N is applied 4 to 6 weeks after planting.

Table 13. Recommended application	ir or maogen (ib		l Drainage Cia	ass ²
	Tillage ¹	Well- Drained	Moderately Well- Drained	Poorly Drained
Corn, sorghum, soybean, small	Intensive	100 - 140	140 - 175	175 - 200
grain, fallow	Conservation	125 - 165	165	200
Grass, grass-legume sod (4 years or	Intensive	75 - 115	115 - 150	150 - 175
less), winter annual legume cover	Conservation	100 - 140	140 -	175
Grass, grass-legume sod (5 years or	Intensive	50 - 90	90 - 125	125 - 150
more)	Conservation	75 - 115	115 -	150

1 Intensive tillage has less than 30% residue cover, and conservation tillage has more than 30% residue cover on the soil at planting.

² Soil drainage class examples are given on page 2.

Category	Test Result:	P ₂ O ₅ Needed	Test Result: K	K ₂ O Needed
Very high			>420	0
High	>60	0	355 - 420	0
			336 - 354	0
			318 - 335	0
			301 - 317	0
Medium	46 - 60	30	282 - 300	30
	41 - 45	40	264 - 281	30
	37 - 40	50	242 - 263	30
	33 - 36	60	226 - 241	40
	28 - 32	70	209 - 225	50
			191 - 208	60
Low	23 - 27	80	173 - 190	70
	19 - 22	90	155 - 172	80
	14 - 18	100	136 - 154	90
	9-13	110	118 - 135	100
	6-8	120	100 - 117	110
Very low	1-5	200	<100	120

Conservation Tillage—On moderately well-drained to poorly drained soils, the risk of denitrification loss is great from N applied at or near planting on conservation-till corn. Alternative practices may include:

- 1. sidedressed N application as noted above;
- 2. use of maximum rate in appropriate recommended range at planting; or
- 3. use of a nitrification inhibitor at planting with N sources that include urea, N-solutions, or anhydrous ammonia with minimum rate of N within the appropriate recommended range (see AGR-185 for additional information).

Manganese

Foliar applications of manganese to manganese-deficient soybean have been superior to soil applications made at planting. Foliar manganese spray is recommended in two forms: (1) as chelated manganese at rates recommended by the manufacturer on the label and (2) as manganese sulfate at a rate of 1.0 to 1.5 lb of actual manganese per acre in 20 to 25 gallons of water when the soybean is 10 inches high or higher. The symptom of Mn deficiency is interveinal chlorosis of the emerging (youngest) leaves. Tissue analysis can also be used to evaluate the Mn status of the plant. The sufficiency range is 15 to 200 parts per million (ppm) Mn in the uppermost mature trifoliate leaves (petiole discarded). See Soil Science News and Views, volume 10, number 8, "Manganese Fertility of Soybean" for additional information.

Category	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K ₂ O Needed
High	>60	0	>300	0
Medium	40 - 60	30	242 - 300	30
	34 - 39	40	226 - 241	40
	28 - 33	50	209 - 225	50
			191 - 208	60
Low	22 - 27	60	173 - 190	70
	16-21	70	155 - 172	80
	11-15	80	136 - 154	90
	9-10	90	118 - 135	100
	7-8	100	100 - 117	110
	6	110		
Very low	1-5	120	82 - 99	120
			64 - 81	130
			46 - 63	140
			<46	150

SMALL GRAINS

(BARLEY, OATS, RYE, WHEAT, AND TRITICALE)

Lime

If water pH is below 6.2, see page 5, and use the rate appropriate to attain a target pH of 6.4.

Nitrogen

Fall Application—Only enough N to provide for good ground cover and to stimulate tillering is necessary. Seedings following tobacco, soybean, or well-fertilized corn will likely have enough carryover N for fall growth. For optimal fertilizer N efficiency, the total fall application should not exceed 40 lb N/A for seedings in fields with insufficient N carryover. Fall-applied N will be of little benefit where little fall growth is expected.

Spring Application—Application from late February to early April is the most effective. Where excessive rainfall occurs in late winter or early spring, causing excessive wetness on less than well-drained soils, split applications of spring-applied N may be justified.

Sources—Experimental results have shown little difference among nitrogen materials commonly used to supply supplemental N to small grains.

Small Grains for Grazing—Total forage production from small grains can be increased by splitting nitrogen applications between fall and spring. For fall grazing, apply 50 to 60 lb N/A at seeding. A late winter or early spring topdressing of 30 to 50 lb N/A will stimulate early growth for additional grazing.

Intensively Managed Wheat—When managed for high yields (70 to 100 bu/A), wheat should receive higher rates of N in the spring. If spring N is split into two applications (early to mid-February and mid- to late March), yields will be 3 to 5 bu/A higher than if all N is applied in a single application in mid- to late March. The February application should be made at greenup, and the March application should be made at Feekes growth stage 5 or 6 (just prior to or at jointing). Green-up may not occur until March in central and northern Kentucky.

Table 17. Spring nitro (lb N/A), small grains.	
Seedbed	Lb N/A
Tilled	60 - 90
No-till	90 - 120

Table 18. Spring nit	rogen rates (l	b N/A), inten	sive wheat.
Applications	Feb	Mar	Total
Single	0	95	.95
Split	30 - 60	75 - 45	105

Category	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K ₂ O Needed
High	>60	0	>300	0
Medium	48 - 60	30	213 - 300	30
	45 - 47	40	187 - 212	40
	41 - 44	50		
	38 - 40	60		
	34 - 37	70		
	31 - 33	'80		
Low	24 - 30	90	159 - 186	50
	17 - 23	100	132 - 158	60
	10 - 16	110	104 - 131	70
Very low	<10	120	<104	80

Double Cropping of Small Grains and Soybean—The phosphate recommendation should be taken from small grains, and the potash recommendation should be taken from soybean. This recommendation can be applied in the fall before seeding the small grain.

CANOLA

Lime

If water pH is below 6.2, see page 5, and use the rate appropriate to attain a target pH of 6.4.

Nitrogen

Fall Application—Only enough N to provide for good ground cover and good root growth is necessary to aid in winter survival. Seedings following tobacco, soybean, or well-fertilized corn will likely have enough carryover N for fall growth. For optimum fertilizer N efficiency, the total fall application should not exceed 30 lb N/A for seeding in fields with insufficient N carryover.

Spring Rates

Previous Cro	0		Lb N/A
Corn, small gra	ains, soybean, fallow	, set-aside	120
Grass-legume			90

Spring Applications—Applications between late February and late March are the most effective time. This coincides with spring green-up. All N should be applied before stem elongation.

Category	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K₂O Needed
High	>60	0	>300	0
Medium	48 - 60	30	213 - 300	30
	45 - 47	40	187 - 212	40
	41 - 44	50		
	38 - 40	60		
	34 - 37	70		
	31 - 33	80		
Low	24 - 30	90	159 - 186	50
	17 - 23	100	132 - 158	60
	10 - 16	110	104 - 131	70
Very low	<10	120	<104	80

Double Cropping of Canola and Soybean—The phosphate recommendations should be taken from canola, and the potash recommendation should be taken from soybean. This recommendation can be applied in the fall before seeding the canola.

HAY AND PASTURES

New Seedings

Lime

See page 5, and use the rate appropriate to attain a target pH of 6.4. For long-term production of alfalfa and alfalfa grass, it is important to raise pH and maintain it in a range between 6.5 and 7.0. (See page 5 for the rate of lime needed to attain a target pH of 6.8 when the water pH is below 6.6.)

Nitrogen

Apply 0 to 30 lb N/A at seeding for legumes or grass-legume mixtures and 0 to 50 lb N/A for grass-only seedings. If the field has a history of high N application, omit N at seeding.

Surface Mine Reclamation

See page 4 for more details.

Molybdenum

If soils are limed to maintain pH values at 6.2 or above, aluminum and manganese toxicities and molybdenum deficiency usually do not occur in forage legumes. However, for soils having pH values below 6.2 at seeding time, molybdenum application to forage legumes is recommended. Apply at the rate of 1 lb of sodium molybdate (6.4 oz of molybdenum) per acre. Dissolve this amount of molybdate in 20 to 40 gallons of water, and spray uniformly over each acre. Apply before planting, and disc into the soil unless using no-till establishment. It is recommended that not more than 2 lb of sodium molybdate (12.8 oz of molybdenum) per acre be used during a five-year period.

Inoculation

Appropriate good-quality inoculant should be applied to legume seed or in the row at planting. Delays in planting inoculated seed may result in poor root nodulation. Numbers of live rhizobia decrease rapidly under dry conditions, with exposure to sunlight and high temperatures, or when dry-packaged with sodium molybdate and fungicides.



For alfalfa yields above 5 tons per acre and red clover yields above 3 tons per acre, fields should be soil sampled every year to monitor P and K levels.

Luxury Consumption of Potassium

Luxury consumption is a phenomenon that all alfalfa producers should be aware of and should try to avoid. Luxury consumption occurs when the alfalfa plant takes up more K than is needed for maximum yield. The additional K is removed with hay harvest and is not available for future cuttings. To minimize luxury consumption, K fertilizer should not be applied in the spring prior to the first cutting for existing stands. For new stands of alfalfa, K fertilizer should be thoroughly incorporated prior to planting.

		Alfalfa or A	Ifalfa-Grass	,		Clover or C	lover-Grass	i
Category High Medium	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K₂O Needed	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K ₂ O Needed
High	>60	0	>450	0	>60	0 `	>300	0
			394 - 450	60				
			363 – 393	90				
			338 – 362	100				
			313 – 337	110				
			297 - 312	120				
Medium	46 - 60	30	291 – 296	130	41 - 60	30	271 - 300	30
	41 - 45	40	285 – 290	140	36 - 40	40	263 - 270	40
	37 - 40	50	279 – 284	150	31 - 35	50	255 - 262	50
	33 - 36	60	272 – 278	160			246 - 254	60
	28 - 32	70	266 – 271	170			238 - 245	70
			260 – 265	180	Mar. 44		230 - 237	80
			254 – 259	190			221 - 229	90
			247 – 253	200			213 - 220	100
			241 – 246	210			205 - 212	110
			235 – 240	220				
			229 – 234	230				
			222 – 228	240				
			216 – 221	250				
			210 – 215	260				
			204 – 209	270				
Low	23 - 27	80	194 – 203	280	27 - 30	60	191 - 204	120
	19 - 22	90	180 – 193	290	23 - 26	70	173 - 190	130
	14 - 18	100	166 – 179	300	19 - 22	80	155 - 172	140
	9-13	110	152 – 165	310	16 - 18	90	136 - 154	150
			139 – 151	320	12 - 15	100	118 - 135	160
			125 – 138	330	8 - 11	110	100 - 117	170
			111 – 124	340				
			97 – 110	350				
Very low	<9	120	<97	360	<8	120	<100	180

HAY AND PASTURES

RENOVATION OF GRASS WITH CLOVERS OF ANNUAL LESPEDEZA

Lime

If water pH is below 6.2, see the table on page 5 for the rate appropriate to attain a target pH of 6.4.

Nitrogen

One factor that is critical to legume establishment in established grass sods is grass competition with young legume seedlings. Use of N at renovation will stimulate grass growth and increase the likelihood of legume stand failure. However, if there is a need for increased grass production during the fall preceding spring legume renovation, a small amount of N (up to 50 lb N/A) can be topdressed between Aug. 1 and Aug. 15. Be sure any increased grass growth is grazed off before legume renovation.

Annual Topdressing

See recommendations for topdressing legume-grass mixtures.

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		а																															

Category	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K ₂ O Needed
High	>60	0	>300	0
Medium	48 - 60	30	257 - 300	30
	45 - 47	40	244 - 256	40
	41 - 44	50	232 - 243	50
	38 - 40	60	219 - 231	60
	34 - 37	70	207 - 218	70
	31 - 33	80	187 - 206	80
Low	24 - 30	90	159 - 186	90
	17 - 23	100	132 - 158	100
	10 - 16	110	104 - 131	110
Very low	<10	120	<104	120

pasture is the only source of feed. Tetany in such animals results from an imbalance of magnesium in their blood. Supplemental feeding of magnesium to nursing cows on such fields is recommended as a means of lowering tetany risk. Applying fertilizer containing magnesium is not recommended to offset potential grass tetany problems. There is little guarantee that the plant will take up the additional applied magnesium when soil test magnesium levels are adequate. See University of Kentucky Extension publication ASC-16, Grass Tetany in Beef Cattle, for detailed recommendations.

Grass Seed Production—For pure stands of tall fescue and bluegrass from which seed will be harvested, an additional topdressing of 60 to 70 lb N/A around Dec. 1, after grazedown, will increase seed yields the following year.

Lime

See page 5, and use the rate appropriate to attain a target pH of 6.4.

Surface Mine Reclamation

See page 4 for more details.

HAY AND PASTURES

WARM-SEASON FORAGES

Sudangrass, Millets, Sorghum-Sudangrass Hybrids

This category includes annual warm-season grasses. Consult University of Kentucky Extension publication AGR-88, *Producing Summer Annual Grasses for Emergency or Supplemental Forage*, for management details.

The soil pH should be maintained between 5.8 and 6.4. If establishing a stand and the water pH is less than 6.2, add lime to attain a target pH of 6.4 (see page 5). If the stand is already established, apply lime to reach a target pH of 6.4 when the water pH is less than 5.8. Apply 60 to 100 lb N/A at seeding plus 40 to 60 lb N/A topdressed after first and second grazedowns or hay clippings. Apply phosphate and potash according to soil test results (Table 29).

Bermudagrass

Bermudagrass is a perennial warm-season grass. Consult University of Kentucky Extension publication AGR-48. *Bermudgrass:* A Summer Forage in Kentucky, for management details.

The pH should be maintained between 5.8 and 6.4. If a stand is being established and the water pH is less than 6.2, then add lime to attain a target pH of 6.4 (see page 5). If the stand is already established, apply lime to reach a target pH of 6.4 when water pH is less than 5.8. For establishing new stands, apply 30 to 60 lb N/A one month after seeding or sprigging. As ground cover is attained, an additional 30 to 50 lb applied around Aug. 15 can be beneficial in stimulating first-year growth. The total amount of N used should be based on the amount of forage needed and whether it is grazed or cut for hay. Nitrogen should be applied in split applications for best results. Apply 60 to 100 lb N/A in the spring when green-up begins. A nitrogen application near 100 lb N/A is needed for top hay production. Apply an additional 60 to 100 lb N/A after each hay cutting or 40 to 60 lb N/A after each grazedown. The last N application should be made by mid-August. Apply phosphate and potash according to soil test results. Table 30 summarizes nitrogen, phosphate, and potash rate recommendations.

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Category	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K₂O Needed
High	>60	0	>300	0
Medium	48 - 60	30	271 - 300	30
	45 - 47	40	263 - 270	40
	41 - 44	50	255 - 262	50
	38 - 40	60	246 - 254	60
	34 - 37	70	238 - 245	70
	31 - 33	80	230 - 237	80
			221 - 229	90
			213 - 220	100
			205 - 212	110
Low	24 - 30	90	191 - 204	120
	17 - 23	100	173 - 190	130
	10 - 16	110	155 - 172	140
			136 - 154	150
			118 - 135	160
			100 - 117	170
Very low	<10	120	<100	180

Table 30. Annual nitrogen, phosphate, potash applications (lb/A), bermudagrasses.

			Annual A	pplication		
Soil Test		Pasture			Hay	
Level	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
High >60 P 300 K	120 - 240	0	0	120 - 400	0	0
Medium 60 - 30P 300 - 200K	120 - 240	30 - 65	30 - 90	120 - 400	30 - 95	30 - 180
Low <30P 200K ¹	120 - 240	65 - 120	90 - 180	120 - 400	95 - 120	180 - 360

¹ The maximum P_2O_5 or K_2O rate shown should be used if P is less than 10 or K is less than 100.

Table 32. Topdressing nitrogen (lb/A) on cool-season horse pastures when maintained at low stocking rates (more than 2 acres/horse).

	N per
Date	Application ¹
Aug. 15 – Sept. 15	30 - 40
Oct. 15 - Nov. 15	30 - 60

¹ Total amount of N to topdress depends on desired result. No N is recommended if clover makes up more than 25% of the pasture. If primary goal is increased tillering for a denser grass stand winter, then one late fall application is sufficient. If fall pasture growth is important then also apply N in late Augustearly September. Suggested dates and rates for topdressing with N are shown above.

Table 33. Topdressing nitrogen (Ib/A) on cool-season horse pastures when maintained at high stocking rates (less than 2 acres/horse).

	N per
Date	Application ¹
Feb. 15 – Mar. 15	up to 40 - 80
May 1-15	up to 30 - 40
Aug. 15-30	up to 40 - 80

1 Total amount of N to topdress should depend on how much additional production is needed. Late spring N applications may have the unintended effect of stimulating unwanted summer weeds. Little or no N is recommended if clover makes up more than 25% of the pasture. Suggested dates and rates for topdressing with N are shown above.

Table 34. Phosphate and potash recommendations (lb/A) for cool-season grass horse pastures when applying annual fertilizer applications.

Category	Test Result: P	P ₂ O ₅ Needed	Test Result: K	K₂O Needed
Very high			>420	0
High	>60	0	321 - 420	0
			301 -320	0
Medium	46 - 60	30	267 - 300	30
	41 - 45	40	240 - 266	30
	37 - 40	50	213 - 239	30
	33 - 36	60	187 - 212	40
	28 - 32	70		
Low	23 - 27	80	159 - 186	50
	19 - 22	90	132 - 158	60
	14 - 18	100	104 - 131	70
	9 - 13	110		
Very low	<9	120	<104	80

mended stocking rate for your soil type. See your county Extension agent or USDA-NRCS specialist for the average stocking rates associated with the soil types found in your area. Or go to the Web Soil Survey Web site for this information (www.websoilsurvey.nrcs. usda.gov). Often, stocking rate information in soil surveys is given in animal unit months (AUM). To convert animal unit months to recommended acres per horse, use the following formula: $(12 \pm \text{AUM}) \times (\text{wt of horse} \pm 1000) = \text{acres required per horse}.$

Sources of Nitrogen—Research in Kentucky has shown that during late fall, late winter, and early spring, there is little difference among the N sources commonly used for topdressing cool-season grasses. After May 1, there is an increased risk that topdressed urea will not be as effective as other N sources. Average efficiency values for urea N applied after early May ranged from 51 to 78% of that observed with ammonium nitrate, depend-

ing largely on the length of time between urea application and the next rainfall. When a urease inhibitor is used in conjunction with urea, the efficiency of urea becomes comparable to that of ammonium nitrate. For urea applied after early May and without an inhibitor, to be an economical substitute for ammonium nitrate, the cost per pound of nitrogen probably should be 15 to 20% less than that for ammonium nitrate-nitrogen. Research indicates that efficiency of liquid urea-ammonium nitrate (UAN) applied after early May is between that of urea and ammonium nitrate. A urease inhibitor can also be used in conjunction with UAN. To avoid burning symptoms on grass forages, remember to apply any granular N source when the leaf surface is dry. Also, avoid leaving piles of granular N in the field, either from misapplication or improper equipment operation because ingestion of significant quantities of N fertilizer can be toxic to horses.

CONSERVATION AND WILDLIFE LAND

Land can be managed to improve soil and water quality, enhance growth of native plant species, or provide habitat and food for wildlife. These types of land management are commonly referred to as conservation programs. The government can offer cost-sharing money to promote the management of land using specific conservation methods.

Riparian Buffer and Filter Strips

Riparian buffers and filter strips are land uses designed to improve water quality. Riparian buffers include land kept in an undisturbed condition for some distance away from the edge of streams. Filter strips are land containing grasses that filter out sediment in runoff from agricultural fields before entering surface water. Riparian buffers can include grasses, bushes, or trees. Filter strips can include warm- and cool-season grasses useful for trapping particles suspended in runoff water.

The pH should be maintained between 5.8 and 6.4. If water pH is below 5.8, apply lime to attain a target pH of 6.4 (see page 5). To ensure thick and vigorous growth, apply 40 to 60 lb N/A at seeding for cool-season grass or in July of the establishment year for warm-season grass. Apply phosphate and potash at seeding according to Table 35. Fertilizer or other sources of nutrients should not be applied on established stands. The management of this land

Table 35. Phosphate and potash recommendations (lb/A) for establishing riparian buffers and filter strips.

Soil Test Level	P ₂ O ₅	K₂O
High >60 P >300 K	0	0
Medium 60 - 30 P 300 - 200 K	30 - 40	30 - 50
Low ¹ <30 P <200 K	40 - 80	50 - 100

The maximum rate should be used if soil test P is less than 6 lb/A or soil test K is less than 90 lb/A.

can involve mowing, with no plant removal, so the nutrients in the grass are recycled back into the soil.

LAWNS AND GENERAL TURF

Establishing New Turf

Mix lime, nitrogen, P_2O_5 , and K_2O into the top 4 to 6 inches of soil before seeding. Use 1.5 lb N/1000 sq ft and lime, P_2O_5 , and K_2O rates recommended in the following tables.

Lime—Use the rate of limestone needed to attain a target pH of 6.4 as indicated in Table 38

Maintenance of Turf

Lime—Based on the soil test pH, apply limestone at rates indicated under the "Establishing New Turf" section. Apply no more than 70 to 100 lb/1000 sq ft at any one time. Additional lime can be supplied as repeated applications at three- to six-month intervals.

Phosphate and Potash—According to soil test results, apply phosphate or potash at rates indicated in Table 39.

Nitrogen—Apply 1 to 1.5 lb actual N/1000 sq ft per application or 40 to 60 lb N/A. The frequency of nitrogen applica-

tions depends on the level of overall maintenance. The following low- and mediummaintenance levels are best for general lawns that get little or no summer irrigation. The high and very high levels usually require some irrigation and a high mowing frequency (see Table 40).

Lb/A Soil	Lb/100	0 Sq F1
Test Level	P ₂ O ₅	K ₂ O
High >60 P 300 K	0-1	0 - 1
Medium 60 - 30 P 300 - 200 K	1-2	1-2
Low <30 P 200 K	3 - 5	3 - 5

Table 39. Phosphate and pot-

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Water pH			Bu	ffer pH	of Sam	ple			If Buffer pH
of Sample	5.5	5.7	5.9	6.1	6.3	6.5	6.7	6.9	Is Unknown
4.5	320	300	280	250	220	180	150	130	180
4.7	320	300	280	240	200	170	140	120	170
4.9	310	290	260	230	190	150	130	110	160
5,1	310	290	260	220	180	130	100	80	150
5.3	300	280	240	210	160	120	90	70	130
5.5	290	270	230	190	140	100	70	60	120
5.7	280	260	220	170	120	90	60	50	100
5.9		240	200	150	100	80	50	40	80
6.1	-	deledele	180	120	80	60	40	40	60
6.3	-		-	90	60	40	40	30	40

See University of Kentucky Extension publication AGR-53, Lawn Fertilization in Kentucky, for more specific details on lawn fertilization.

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			21																										

N Applicatio per Year	ns:	Cool-Season Grasses ¹	Warm- Season Grasses ²
Low	1	Oct Nov.	June
Medium	2	Sept. – Oct., Nov. – Dec.	May, July
High	3	Sept. – Oct., Oct. – Nov., Nov. – Dec.	April, June, August
Very high	4	Sept. – Oct., Oct. – Nov., Nov. – Dec., late May – early June (½ rate)	April, May, June, August

Kentucky bluegrass and tall fescue. Red fescue and all cool-season grasses grown in shady lawns should be fertilized only once a year.
 Bermudagrass and zoysiagrass. Zoysiagrass needs only a minimal

amount of N after lawn is fully established.

STRAWBERRIES

Establishment

Lime—Limestone should be applied three to six months before planting and worked into the top 4 inches of soil. Strawberries are most productive when the soil pH falls between 6.0 and 6.5. See page 5, and apply the rate of lime to attain a target pH of 6.4. If established plantings need lime, an application of agricultural limestone during the dormant season is best.

Nitrogen—Nitrogen fertilizer should not exceed 60 lb N/A (2.2 oz nitrogen per 100 sq ft) broadcast before planting. Sidedressing with 30 lb N/A in two bands, one on each side of the row with each band placed 2 to 4 inches deep and 8 inches from the plants, is just as effective as broadcast N applications and reduces competition from weeds.

For an early fall application, apply 30 to 40 lb N/A between Aug. 15 and Sept. 10 to promote fruit bud development in the next season.

Spring nitrogen applications are generally avoided during fruiting years because these applications lead to greater vegetative growth, lower fruit yield, delayed ripening, and increased fruit rot.

Magnesium—See Table 42 for recommendations.

Renovation

Use plant analysis during mid-season harvest and fertilize accordingly, or obtain a soil test following harvest. Apply 30 lb N/A (1.1 oz N/100 sq ft), follow lime rate recommendations to attain a target pH of 6.4, and apply phosphate and potash as recommendations in the "Establishment" section. Fertiliza-

	P ₂	05	K	20
Lb/A Soil Test Level	Lb/A	Oz/100 Sq Ft	Lb/A	Oz/100 Sq Ft
High >70 P >300 K	0	0	0	0
Medium 70 - 35 P 300 - 200 K	0 - 80	0-3	0 - 40	0 - 1.5
Low <35 P <200 K	80 - 150	3-6	40 - 80	1.5 - 3

tion should be done before any cultivation during renovation. Contact your county Extension office to obtain plant analysis kits.

Types of Application

Broadcast—Apply fertilizer over the tops of the plants when leaves are dry. Avoid possible foliage burn by brushing nitrogen granules off the plant leaves. A canvas attached to the back of the fertilizer applicator works well in brushing fertilizer from the plants.

Sidedress—Banded fertilizer should be placed 2 inches below the soil surface and 6 to 8 inches from the plants in established stands.

COMPREHENSIVE NUTRIENT MANAGEMENT PLAN

FOR

STEVE CANNON

APPENDIX E

- Page 1 Operator's Record of manure sold or given away
- Page 2 Operator's Record of Nutrients Applied to Corn in 2011
 - Manure Test Report
 - Soil Test Reports for all fields manure applied
- Page 3 Operator's Record of Nutrients Applied to Wheat in 2012
 - Manure Test Report
 - Soil Test Reports for all fields manure applied
- Page 4 Operator's Record of Nutrients Applied to Corn in 2012
 - Manure Test Report
 - Soil Test Reports for all fields manure applied
- Page 5 Operator's Record of Nutrients Applied to Wheat in 2013
 - Manure Test Report
 Soil Test Reports for all fields manure applied
- Page 6 Operator's Record of Nutrients Applied to Corn in 2013
 - Manure Test Report
 Soil Test Reports for all fields manure applied
- Page 7 Operator's Record of Nutrients Applied to Wheat in 2014
 - Manure Test Report
 Soil Test Reports for all fields manure applied
- Page 8 Operator's Record of Nutrients Applied to Corn in 2014
 - Manure Test Report
 Soil Test Reports for all fields manure applied

Appendix E Page 1 -- Operators Record of manure sold or given away

Additional Comments:			Name of Customer / Recipient
			Address
			Amount in Total Gallons
			Date Sold or give away





Appendix E - Page. 2 — Operators Record of Nutrients Applied to Corn in 2011

	Of	Form	Application	Per Acre	of	Test	Phosphorus
(Tract) I hat Of using V make up Crop Crop app crop unit Unit	Waste application	of Waste	method	Of Swine Waste	Nitrogen Applied	Phosphorus (STP) for this	Index Rating For this
				Applied		crop unit (lbs/ac)	Crop unit
412 1,2,4,6 130.7 Corn Ap	April-May 2011	Liquid	Injection	·		45 to 90	Medium
688 2,3,4, 169.6 Corn Ap	April-May 2011	Liquid	Injection			26 to 84	Medium
3644 1,2 86.2 ac Corn Ap	April-May 2011	Liquid	Injection			59 & 52	Medium
412 1,2,4,6 130.7 Corn (of 131.6)	May 2011	Anhy	Injection			45 to 90	Medium
688 2,3,4, 169.6 Corn 4b,6,6a,	May 2011	Anhy	Injection			26 to 84	Medium
3644 1,2 86.2 ac Corn	May 2011	Anhy	Injection			59 & 52	Medium
386.5ac Corn							

applied from commercial fertilizer source Landowner has chosen to apply Swine waste at a uniform rate over all 386.5 acres of corn. This should result in approximately 133 lbs/ac of Plant Available Nitrogen. Anhydrous Ammonia will then be side dressed at a rate of 65.lbs. No additional P or K will be

Appendix E - Page. 3 -- Operators Record of Nutrients application to Wheat in 2012

		3644	688	412	Farm ID. (Tract)
	,	1,2	2,3,4, 4b,6,6a,	1,2,4,6	Field Numbers That make up crop unit
		86.2 ac	169.6	130.7 of 131.6	Total Acres Of Crop Unit
		Wheat	Wheat	Wheat	Nitrogen using Crop
		Feb-March 2012	Feb-March 2012	Feb-March 2012	Timing Of Waste application
		Urea	Urea	Urea	Form of Waste
		Broadcast	Broadcast	Broadcast	Application method
					Lbs Per Acre Of Nitrogen Applied
		None	None	None	Gallons Per Acre Of Swine Waste Applied
		59 & 52	26 to 84	45 to 90	Soil Test Phosphorus (STP) for this crop unit (lbs/ac)
		Medium	Medium	Medium	NRCS Phosphorus Index Rating Ror this Crop unit
			1,2 86.2 ac Wheat Feb-March Urea Broadcast None 59 & 52	2,3,4, 169.6 Wheat Feb-March 2012 Urea Broadcast None 26 to 84 4 1,2 86.2 ac Wheat Feb-March 2012 Urea Broadcast None 59 & 52 2012 2012 None 59 & 52 100 2012 2012 2012 2012 2012	1,2,4,6 130.7 Wheat Feb-March Urea Broadcast None 45 to 90 2,3,4, 169.6 Wheat Feb-March Urea Broadcast None 26 to 84 4b,6,6a, 2012 Urea Broadcast None 59 & 52 1,2 86.2 ac Wheat Feb-March Urea Broadcast None 59 & 52 2012 1,2 1,2 1,2 1,2 2012

University of Kentucky Recommendation (AGR-1) is to apply 90 to 120 lbs of Nitrogen for Wheat production. The landowner has chosen the lower rate of 90 lbs/ac. Urea is 42% nitrogen. NO Additional P or K will be applied other than from Swine Waste.

Appendix E - Page. 4 -- Operators Record of Nutrients applied to Corn in 2012

	4017	690	687	659	414	4017	690	687		414	Farm ID. (Tract)
	1,2	1,2,3,4,5,6,7,8 ,9, 10,11,20	<u> </u>	1,2,3,5	1,2,3,4,5, 6,7	1,2	1,2,3,4,5,6,7,8 ,9, 10,11,20	<u> </u>	1,2,3,5	1,2,3,4,5, 6,7	Field Numbers That make up crop unit
386.5 ac	34.7	162.0 of 162.4	14.6	83.1	92.1	34.7	162.0 of 162.4	14.6	83.1	92.1	Total Acres Of Crop Unit
Corn	Corn	Com	Com	Com	Com	Com	Com	Com	Corn	Corn	Nitrogen using Crop
	May 2012	May 2012	May 2012	May 2012	May 2012	April-May 2012	April-May 2012	April-May 2012	April-May 2012	April-May 2012	Timing Of Waste application
	Anhy	Anhy	Anhy	Anhy	Anhy	Liquid	Liquid	Liquid	Liquid	Liquid	Form of Waste
	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Application method
S											Gallons Per acre Of Swine Waste Applied
											Lbs Per acre Of Nitrogen Applied
	19.6	22 to 42	60.25	26 to 84	26 to 83.5	19.6	22 to 42	60.25	26 to 84	26 to 83.5	Soil Test Phosphorus (STP) for this crop unit (lbs/ac)
	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	NRCS Phosphorus Index Rating For this Crop unit "PLANNED"

Appendix E - Page. 5 -- Operators Record of Nutrient application to Wheat in 2013

Farm ID. (Tract)	Field Numbers That make up	Total Acres Of Crop	Nitrogen using Crop	Timing Of Waste	Form of Waste	Application method	Amount of Nitrogen (lbs/ac) Applied	Gallons Per Acre of Swine	Soil Test Phosphorus (STP) for this	NRCS Phosphorus Index Rating For this
	crop unit	Unit					. ·	Waste Applied	crop unit	Crop unit
414	1,2,3,4,5, 6,7	92.1	Wheat	Feb-March 2013	Urea	Broadcast		None	26 to 83.5	Medium
659	1,2,3,5	83.1	Wheat	Feb-March 2013	Urea	Broadcast	-	None	26 to 84	Medium
687	-	14.6	Wheat	Feb-March 2013	Urea	Broadcast		None	60.25	Medium
690	1,2,3,4,5, 6,7,8,9, 10,11,20	160 of 162.4	Wheat	Feb-March 2013	Ürea	Broadcast		None	22 to 42	Medium
4017	1,2	34.7	Wheat	Feb-March 2013	Urea	Broadcast		None	19.6	Medium
Universit chosen th	y of Kentucle lower rate	cy Recomn of 90 lbs/a	nendation (/	AGR-1) is to a 42% nitrogen.	pply 90 to	University of Kentucky Recommendation (AGR-1) is to apply 90 to 120 lbs of Nitrogen for Wheat production. The landowner has chosen the lower rate of 90 lbs/ac. Urea is 42% nitrogen. NO Additional P or K will be applied other than from Swine Waste.	rogen for W	heat produc	r Wheat production. The landowner applied other than from Swine Waste	owner has

Appendix E - Page. 6 - Operators Record of Nutrients Applied to Corn in 2013

1117	3644	688	412	3644	688	412		Farm ID. (Tract)
•	1,2	2,3,4, 4b,6,6a,	1,2,4,6	1,2	2,3,4, 4b,6,6a,	1,2,4,6		Field Numbers That make up crop unit
386.5ac	86.2 ac	169.6	130.7 (of 131.6)	86.2 ac	169.6	130.7 (of 131.6)		Total Acres Of Crop Unit
Corn	Corn	Corn	Com	Corn	Corn	Corn		Nitrogen using Crop
	May 2013	May 201 3	May 201 3	April-May 2013	April-May 2013	April-May 2013		Timing Of Waste application
	Anhy	Anhy	Anhy	Liquid	Liquid	Liquid		Form of Waste
	Injection	Injection	Injection	Injection	Injection	Injection		Application method
							Арриеи	Gallons Per Acre Of Swine Waste
								Lbs Of Nitrogen Applied
	59 & 52	26 to 84	45 to 90	59 & 52	26 to 84	45 to 90	(lbs/ac)	Soil Test Phosphorus (STP) for this
	Medium	Medium	Medium	Medium	Medium	Medium	"PLANNED"	NRCS Phosphorus Index Rating For this

U.K. recommendations (AGR-1) for nitrogen is 165 lbs/ac up to 200 lbs/ac of Nitrogen for Corn using Conservation Tillage.

applied from commercial fertilizer source lbs/ac of Plant Available Nitrogen. Anhydrous Ammonia will then be side dressed at a rate of 65. lbs. No additional P or K will be Landowner has chosen to apply Swine waste at a uniform rate over all 386.5 acres of corn. This should result in approximately 133

Appendix E - Page. 7 -- Operators Record of Nutrients application to Wheat in 2014

	 	,				_,		,								
			-	3644	000	200	412						(lract)	Ð.	Farm	
	,			1.2	2,3,4, 4b,6,6a,	ر د د	1,2,4,6				crop unit	make up	Inat	Numbers	Field	
				86.2 ac	109.0	1001	130.7 of 131.6				Unit	Crop	9	Acres	Total	
				Wheat	wneat	1171	Wheat					Crop	gaisu	Nitrogen		
			2014	Feb-March	reb-March	7-1-1-1-1-1	Feb-March 2014					application	Waste	õ	Timing	
				Urea	∪rea	7 7	Urea					Waste	of	Form		
				Broadcast	Broadcast	1	Broadcast						method	Application		
										Applied	Nitrogen	Of .	Acre	Per	Lbs	
				None	None	1 T	None	Þ	Applied	Waste	Swine	Ç	Acre	Per	Gallons	
	,			59 & 52	20 to 84		45 to 90		(lbs/ac)	crop unit	for this	(STP)	Phosphorus	Test	Soil	
				Medium	Medium		Medium	"PLANNED"		Crop unit	For this	Rating	Index	Phosphorus	NRCS	

University of Kentucky Recommendation (AGR-1) is to apply 90 to 120 lbs of Nitrogen for Wheat production. The landowner has chosen the lower rate of 90 lbs/ac. Urea is 42% nitrogen. NO Additional P or K will be applied other than from Swine Waste.

Appendix E - Page. 8 -- Operators Record of Nutrients applied to Corn in 2014

	1047	4017	690	687	659	414	4017	690	687	659	414	Farm ID. (Tract)
	1 9 24	1)	1,2,3,4,5,6,7,8 ,9, 10,11,20	⊢ ~`	1,2,3,5	1,2,3,4,5, 6,7	1,2	1,2,3,4,5,6,7,8 ,9, 10,11,20	,	1,2,3,5	1,2,3,4,5, 6,7	Field Numbers That make up crop unit
386.5 ac	9	347	162.0 of 162.4	14.6	83.1	92.1	34.7	162.0 of 162.4	14.6	83.1	92.1	Total Acres Of Crop Unit
Corn	COLL	Com	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Corn	Nitrogen using Crop
	2014	Max	May 201 4	May 201: 4	May 2014	May 201 4	April-May 2019	April-May 201 4	April-May 2014	April-May 201 <i>i</i>	April-May 2014	Timing Of Waste application
	2 HIII y	Anhv	Anhy	Anhy	Anhy	Anhy	Liquid	Liquid	Liquid	Liquid	Liquid	Form of Waste
	TIT O O CLASSICAL	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Injection	Application method
Ø							-					Gallons Per acre Of Swine Waste Applied
												Lbs Per acre Of Nitrogen Applied
	10.00	10 6	22 to 42	60.25	26 to 84	26 to 83.5	19.6	22 to 42	60.25	26 to 84	26 to 83.5	Soil Test Phosphorus (STP) for this crop unit (lbs/ac)
	TITOGRAM	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	NRCS Phosphorus Index Rating For this Crop unit "PLANNED"